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HANDBOOK OF ARCHITECTURE

Part II

ARCHITECTURAL STYLES

Volume 4

ROMANESQUE AND GOTHIC ARCHITECTURE

Heft 3

Detail Church Architecture

By Max Hasak

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STUTTGART

1902

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Volume 4. Romanesque and Gothic Architecture.

Section C. Church Architecture.

By Max Hees.

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ROMANESQUE AND GOTHIC ARCHITECTURE.

C. Church Architecture.

By Max Hasak.

Chapter 1. General Remarks.

1. Characteristics of Mediaeval Churches.

The great advantage of mediaeval architects was the clear recognition of the need on which was based the problem of the time, then to decide accurately on the "programme", to strive for the most suitable and appropriate solution, and to also find this, -- to his fame be it emphasized. Indeed not merely the "programme" for the plan and cross section, but increasingly for the elevation, and practically for all details in windows, doorways, cornices and decorations.

Mediaeval architects did not permit themselves to be induced to vary and injure the programme in favor of other times and of their creations. They did not feel it as a heavy restraint, from which men released themselves whenever possible, in order to force the problem into the architectural scheme preferred by foreign peoples, for other requirements and unintelligible conditions. They did not imitate the buildings of the Greeks and Romans; no, for the needs of the architectural were for them the starting point of their creations, the magical germ of a new art, that ever put forth new flowers, ripened new fruits, in order to leave behind that forest of wonderful works, which after centuries of devastations still amazes us and irresistibly invites every one to enter, to refresh himself in its magnificent aisles and to feel innately cheerful in the home.

In contrast therewith stands the art of the Renaissance, whether that of past centuries or that of the later period, which endeavored to cast the forms of the Greeks and Romans over our structures like a garment, one that is generally unsuitable, but is indeed forced upon the building by compulsion. Even if the covering be masterly, though its details have sufficient beauty, its general form is proud and majestic, and even if the divinely favored artist has woven it, one cannot avoid the knowledge, that it is a sham; it is a mere covering, neither resulting from the construction, from the needs, the climate, or material, nor from our customs; yes, it is never

flesh of our flesh. And since we are not the fathers but merely repeaters, so do we never reach the originators of that art, from whose innermost being it sprang, whose needs it expressed, to whose heaven and sky it was suited, and whose heart's blood circulates within it.

If it be objected, that mediaeval art did not at first possess the points described, that this was not the solution fulfilling the purpose; that it did not in general, as in all its details, spring from our construction and materials and necessities; that this was an ideal, still unfortunately lacking form and life, then will the course of the present and the succeeding volumes show how far the proof therefor may be produced or fail. In any case, mediaeval art teaches how men may usefully pass over this path, how the present may in evolution do the like, and similarly draw from the unfailing source of suitability a new method, that is peculiar to our own time, and which will produce a "new style" for the future.

There is certainly still a way of regarding art, which Semper employed in his "Stil,"¹ and on account of which his famous work chiefly originated:-- namely that architecture is an art of external covering and is merely this, and that the spirit of handicraft striving for anything else, and particularly mediaeval art, is not art at all, but merely is a matter of handicraft.

Young Germany will scarcely agree with him, and thus it is really unnecessary to contradict this idea of Semper. But the statement of the precedence of mediaeval architects in the creation of their works in forms never previously seen or even anticipated, of itself becomes a refutation of that view of art, and it will show that only one possibility exists, for leaving the weary round of an "everlasting Renaissance," by making an end of the perennial imitation of forms long since passed away, escaping from a clinging unfruitfulness, particularly by striking into the path followed by the middle ages:-- the way of a rational style of architecture.

The scrupulous following of the natural science of Pliny condemned the middle ages to sterility and puerility in that domain. Would we not today still be without steam, electricity, science and all transforming technics, if modern times had made

a "sacrifice of its own understanding" to the ancient Greeks and Romans? Should we now possess the masterworks in music, if the middle ages had not freed themselves from the ban of the antique and childish methods? Should we enjoy our marvellous poets, if learned men had continued to speak Latin and cultured persons French; if the poets had written in Greek metres? Should we possess the magical aisles of Gothic cathedrals, if the middle ages had only sought their salvation among the ancients?

Men do also finally now divest themselves of "traditional and made-up art;" they draw from their own hearts, from their own land and for our own sun!

Yet this does not signify for the individual, that he must oppress his brain with fanciful and nonexistent monstrosities and caprices, merely that he must not abruptly create from nothing new things, never seen previously. The imagination of the artist is not delirium; this is a transformation, which is unfortunately current today. The new can never be stamped out of the ground. Human reasons must transform existing and traditional ideas; one stands on the shoulders of its predecessor; only in this manner will be created permanent new products.

But two things appertain thereto; a clear purpose and a correct principle! Unconsciously and as if creating a coral or a being without soul, but gifted with the "divine spark" of genius, thus unfortunately do men commonly regard the artist, and even seek to regulate his training.

Only with no spiritual development! This acts on art like a mildew and robs the young artist of precious time. He needs only the training of the hand and the eye!

Divine art, how hast thou then been degraded! Man does not master thee; no, merely his body; his most precious part, the spirit, is thy enemy!

In spite of the masters of knowledge, "who beside the dreamy throne -- permit to art the place of the foremost slave!" What says the poet:--

"Canst thou excel the bee in industry,
A worm is thy teacher in skill;
Thy science is shared with past spirits;
Art, O mankind, thou hast alone."

Since mankind is spirit and body in a single being, in con-

contrast to the past spirits and the bodies of animals, he is alone in condition to produce art works; for this he requires training of both parts, the body and the mind. What men have "made" of painting and sculpture by the one-sided teaching of the body lies clearly before the eyes; certainly not much, but something.

Let us then examine mediaeval artists by the works of their creation.

We shall first see how they master the whole, in order to more thoroughly show the different parts, to consider their origin, to determine the need that called them into existence, and to display all the skill and craft, that brought this requirement into form and shape. We shall likewise consider here the course of the organic transformation of the forms and the solutions of architectural structures transmitted to the middle ages, to fix the era, at which a clear purpose arises before all eyes, where an endeavor inspires every one, where in scarcely conceivable concord hundreds of divinely endowed persons devoted their reason and imagination to a great end, the Gothic cathedral, until that previously unknown magical work rose to the clouds in proud strength and beauty, and gathered in its broad aisles the people of an entire province. Then succeeding races turned to their forms, which they changed and created those for the lesser conditions of separate communities. But a mildew fell upon the development. For art is required money, again money, and furthermore money -- and such with many peoples.

A hundred years' war devastated France; in Germany prevailed the period without an emperor, the terrible time; black death brought misery and poverty. Only materials remained for the construction of the most necessary buildings. But certain families of architects endured through the evil period, and when a new prosperity arose in the 15th century, the late Gothic produced its wonderful flowering. Those are magnificent pieces of ornamentation, but the spirit has vanished; the details have almost entirely disappeared in a lacework of stone with innumerable useless bars and grooves. Foliage has taken the unsatisfactory form of the cabbage leaf. Capitals and bases have vanished, and ribs have shrunk into plain fillets. The Renaissance was salvation from this art style!

2. Sequence of the Different Styles.

Mediaeval architecture divides into two great sections:--
Romanesque and Gothic art.

As Romanesque art is designated that found in Christian lands after the year 1000. Its root is Early Christian art. This is well known to be the same art, which was developed from Roman architecture after Constantine the Great accepted Christianity and the resulting declaration of Christianity as the religion of the state; that art, which was the subject of Division II, Volume 2, Heft 1 of this Handbook. The development of Early Christian from Roman art coincides with the penetration of the German races into the Roman empire, and thus the climax of this art appeared in Italy under the rule of the Goths. S. Vitale at Ravenna was commenced in 526, the year of the death of Theodoric the Great. S. Sophia in Constantinople only followed 10 years later. While there is still visible in Italy the pedigree of S. Vitale, the Pantheon, the Temple Minerva Medica, and the Tomb S. Costanza at Rome, S. Lorenzo at Milan, and the Baptistery at Ravenna, no similar ancestor of S. Sophia is known in Byzantium.

This Early Christian art came to a stand, since the mighty contests of the East Goths, Byzantines and Longobards for supremacy, as well as failure of crops, plagues, famine and flood destroyed the people and their wealth, so that the buildings of the Lombard period did not seem worth preserving to later centuries, and thus structures of the time between 600 and 1000 do not remain in Italy.

Likewise in Spain, Gaul, on the Rhine and in the remainder of Germany after its conversion to Christianity, the new German rulers built much and splendidly; but scarcely anything of these buildings remains. Only the Minster of Charlemagne in Aix-la-Chapelle, the Western portion of the Minster at Essen, the Portico at Lorsch, as well as the Western tower at Werden, etc., show how Early Christian art was developed in the North. Only from the year 1000 onward have the buildings remained here in greater numbers and exhibit that art stamp, which we term Romanesque. This art tendency was developed during the 11 th century in the different countries into definitely expressed separate schools.

In Italy, upper Italy separated from the school of middle Italy. Germany presents until in the 12 th century a native school, that later exhibits varied colorings in Saxony, on the lower Rhine and in Southern Germany, and in general it is allied to the Romanesque art of upper Italy. France is divided into a great number of distinct schools. Such are those of Burgundy, Provence, Perigord, Languedoc, Auvergne, Poitou, Ile-de-France, Champagne, Normandy and Picardy.

5 Within most of these Romanesque schools and at most in the course of the 11 th and 12 th centuries, there appears a change in the direction of Gothic richness, and it prevails elsewhere in their structures; the school of Paris, and especially in the ancient diocese of Soissons after 1100, exhibit attempts to vault the churches by cross vaults on ribs, thereby completely transforming the interior. The Abbey Church of S. Denis near Paris then possesses in its choir of 1144 the earliest definitely Gothic interior. While the transformation of the interior near Paris thus occurred between 1100 and 1144, the exterior still remained almost wholly Romanesque and changed only about 1200 to distinctly Gothic forms. The designation of "French transition style" must therefore be separately applied to the interior and the exterior.

During this period -- 1150 to 1200 -- this Gothic style entirely conquered all Northern France as far as the Loire, together with Burgundy, and there arose in general five schools; those of Ile-de-France, of Normandy, of Champagne, of Burgundy, and that of the English part of France, thus of Anjou and Poitou.

The knowledge of these French acquisitions spread in Germany after about 1180, indeed because German masters evidently went to France. For the external elevation remains German-Romanesque, though developed to greater richness, while in the interior the early Gothic ribbed vault was naturalized with all its details. Such buildings are especially the Cathedrals at Basle and at Worms, the Eastern part of the Cathedral at Spire and of that at Treves, the transverse aisle of the Minster at Freiberg, etc. They represent the actual "transition style" for Germany. After the devastating contests of Philip of Swabia with Otto of Saxony, therefore after 1208,

the burned Romanesque churches everywhere were furnished with Gothic vaults. In these buildings has therefore been seen the actual transition style, thus for example, S. Cunibert and S. Gereon at Cologne, Sinzig, S. Quirin at Neuss, and the like. Where new buildings were erected there, this was done in the Gothic style without exception; the Church Liebfrauen at Treves in 1227, the Church S. Elisabeth at Marburg in 1285, and the Cathedral at Cologne in 1248.

The French ribbed vault was perhaps already known in England from 1160. The side aisles of Peterborough exhibit the English treatment of it. With the rebuilding of Canterbury after the fire of 1174 by a Frenchman, William of Sens, who, like the architects in Germany, retained the Romanesque external skin, and inserted within it an internal early Gothic vaulted structure, treated in the richest manner, the Gothic made its entry into England. This Gothic style then blossomed for a century in the entire Christian world. In the 13 th century, it apparently coincides with "early Gothic". Then began in the 14 th century a tasteless and mechanical art, the "high Gothic", to give place in the 15 th century to the sportive and capricious "late Gothic".

In Italy as in other countries, the Romanesque architects adopted about the end of the 12 th century the French acquisitions in the interiors of churches. These are shown by S. Ambrogio at Milan and S. Michele at Pavia. The earliest Burgundian Gothic was introduced in the Monasteries at Fossanova (1208) and Casamari (1217), thus immediately after 1200. Likewise the developed "early Gothic" appeared about the same 6 time in Italy as in Germany, thus in S. Andrea in Vercelli and S. Francesco at Assisi. This was transformed into an Italian variety with little beauty, as represented by the Cathedral at Florence.

With the beginning of the 15 th century, the eyes of the Italians were again diverted to the details of the ancient Roman buildings. Men began to not merely introduce them in existing structures as in the Romanesque period, but they threw away the latter entirely and sought to imitate the ancients in everything. The 15 th century in Italy is occupied by this transformation; it is the period of the Italian early Renaiss-

Renaissance. Germany and France firmly adhered to their old late Gothic during this time. Then in Austria occurred the first Renaissance details just before 1500, but somewhat later in the remainder of Germany, especially on memorial slabs, market fountains and similar ornamental objects and small structures. The episcopal cities of Mentz, Halle, Hildesheim and Meissen preceded all others. Until 1550, Renaissance details then everywhere conceal the traditional Gothic structural masses to thereby completely make an end of Gothic in Germany likewise.

3. Sequence of Architectural Forms.

The chronological sequence of the mediaeval styles of architecture being thus stated, the sequence of their forms will be briefly given.

As for the chief characteristics, that differentiate the two styles, Romanesque art exhibits the semicircular arch, the cushion capital (except in France), a fanciful scroll ornament and usually wooden ceilings. If vaults exist, they are either cross vaults without ribs or tunnel vaults. Roofs are rather low than steep.

Gothic art almost exclusively prefers the pointed arch, the bell capital, natural foliage and native animals as the ornamentation of buildings. Vaulted ceilings cover interiors by means of cross vaults on ribs. The roofs rise steeply.

From whence the pointed arch originated is hard to say. It occurred near Paris after 1100, together with attempts to construct cross vaults on ribs. To regard Moorish art in Spain as the source is not acceptable on account of the different form, and furthermore men should then mean that Spain and Eastern France must have preceded with the pointed arch, and not the so distant vicinity of Paris. Much rather was this arch introduced by the crusades, since architects must naturally have been taken along as military engineers. Buildings in Egypt apparently show the pointed arch much earlier (Mosque of Amrou). But at about this time the art of Egypt must certainly have been described to their children as a favored land with Syria. Likewise a number of details of the vanishing Romanesque art of Germany must also have been contributed by the crusades. If one remembers the choir of Church Neuwerks at

Goslar and sees those of the Church of S. Simeon Stylites (died 459) at Kalat-Seman in Syria, he is then astonished by the surprising similarity, being puzzled by any other explanation.

In the early Gothic period, the pointed arch shows a more obtuse form than in the best and the late Gothic times. The two centres generally divide the base into three equal parts. The best Gothic locates these centres in the springings of the arch; the late Gothic separates them still further. The later art also adopts the oval and the round arch in its series of forms.

The early Gothic foliage, which is formed after nature, was already abandoned in the best Gothic period for the sake of pattern leaves, which imitate the thistle and the cabbage. In the late Gothic time, swellings and knobs grow out of these leaves.

4. Romanesque Art.

Concerning the designation of the two chief divisions of mediaeval art by "Romanesque" and "Gothic", views differ in regard to their origin. The name "Romanesque" first occurred about 1840 and apparently owes its origin to the egotism of the French. It is very regrettable, that Germans have permitted this appellation to be forced upon them. Romanesque architecture on the Rhine, the Moselle and the Danube originated just as early and independently as in France, Italy and Spain. Only the English received their Romanesque art from France after the invasion of the Normans, and therefore they term the architectural style under consideration the "Norman" style. Almost nothing of the preceding Saxon buildings there has remained.

Only from the point of view, that also those languages, which were formed from the Latin language after the incursion of the Germans into the Roman empire, were called Romanesque (Romance), that Romanesque art was likewise formed from Roman art after the Germans invaded the Roman empire, and that Germany on the Rhine, the Moselle and the Danube was also previously Roman, upon this truly weak justification is based this appellation.

'Romanesque architecture might much rather be termed Germanic'; for it exhibits a common stamp from the Eastern part of Spain to the Baltic provinces and from Sweden to lower Italy. But this can only have been effected by the Germans everywhere

present. Further, the less a country was permeated by Germans, the more "Roman" became the "Romanesque" art.

5. Gothic Art.

If Romanesque art came by that name through the egotism of the French and the weakness of the Germans, then did the term "Gothic" come from the hatred and scorn of the Italians for this "German" art. Apparently Vasari adopted this name about 1550 in his work, "Lives of the most excellent painters, sculptors and architects", I. Introduction, as an expression of existing views. He writes as follows:-- "There is further another kind of works, that are called German. In ornament and in proportions, these are very different from the ancient and from the modern. The great do not employ them and avoid them as detestable and barbarous, since all order is wanting to them; they might rather be termed bizarre and disorderly. In their buildings, of which many exist and have made the world sick, they have the doorways decorated by thin columns, turned like vine stocks, that have no strength for supporting burdens, however light these may be. And thus they create with all their faces and their other ornaments accursed tabernacles, one above another, with so many pyramids, points and leaves, that it not only appears impossible for them to stand, and that they cannot support themselves, and they look rather as if made of paper than of stone and marble. And they make on these buildings so many projections, breaks, corbels, gables, so that their structures are disfigured. And meanwhile they place one thing above another and go so high, that the apex of a doorway touches the roof. This style was invented by the Goths, who after the destruction of the ancient buildings by the wars and the deaths of architects, constructed these buildings in this manner from what remained. They executed their vaults with pointed arches and filled all Italy with this flood of buildings. To no longer make them, men have gotten rid of them in every way. God preserve every land from resorting to such ideas and to such a mode of building, which, since it differs so much from the beauty of our structures, deserves that men should not speak of it otherwise."

Just as little as the "Gothic" was a barbaric art, at most in the mistreated Italian Gothic, as little were the Goths

barbarians. Today Germans no longer use Vasari's imprecations against Gothic, and it is to be hoped that they will no more join in the abuse of our ancestors, whether Goths, Vandals or Lombards. Only the German hatred of foreign peoples has stamped them as barbarians.

6. Plan of the Church and its Subdivisions.

Let us now consider the monuments themselves. We will commence by analyzing the buildings as an entirety. There is at first the ground plan.

In all creations of architecture, two things are to be regarded:-- the forms which had become traditional, and the requirement, that transformed it. To the need was yet added the kind of materials, the individuality of the workmanship, and the designs of man, that influenced and changed the new treatment.

The traditional forms of ground plans of the church are the basilica of three or more aisles of the Early Christian period and the circular buildings of the baptisteries and tomb-churches. The latter were scarcely considered by the middle ages and only the basilica was transformed for its purposes.

Three requirements must be satisfied by the greater number of mediaeval churches -- they must serve as parish churches for the assembling of not too large communities, so that these might attend divine service on Sundays and week days and receive the sacrament. The second kind must be suited as monastery churches to the needs of the monastic community. The third kind, best known and most costly, are the cathedrals, also termed cathedral churches or minsters, which had to serve the bishops and their chapters as churches for the episcopal offices.

The "programmes" for these three kinds of churches are in part entirely different; yet the cathedrals and nearly all monastery churches have in common with parish churches, that likewise in them is a large community to be cared for, so that a part of their structure must represent the parish church. This is chiefly the western portion of the nave. Yet a structure sometimes breaks through the prescribed limits, and thus the chief parish church of a proud city or the monastery church of a powerful abbey attempts to imitate the bishop's cathedral, to excel it if possible -- naturally with the inju-

injury of its purpose.

Chapter 2. Parish Churches.

a. Plan of the Parish Church.

7. Dimensions and Number of Aisles.

Let us first consider the parish church, the simplest and most common type. Men scarcely regard it on account of the colossal cathedral and monastery churches. And yet it exists and must be found everywhere, that a community of Christians desires to assemble for the worship of God. It must afford space for a not too large number of believers, so that these may be present at the mass, hear the sermon and be able to receive the sacrament.

The voice of the preacher at the same time cannot be heard beyond 98.4 ft.; therefore 181.2 ft. for the length of church aisles is normal for the larger parish church, not including the choir. On the contrary, the width of the aisle depends not only on the needs, but likewise on the structural possibilities.

If the community be small, then one aisle naturally suffices; many of such churches were found in the Romanesque period, especially in the villages. This plan is so simple and so self-evident, that it does not appear necessary to add examples.

If the community were large and one aisle was no longer sufficient to accommodate it, then recourse must be had to three-aisled or even to five-aisled churches. For the architect of parish churches seldom dared to exceed 32.6 ft. span of the aisle; only the country north and south of the Pyrenees made a famous exception in this respect. A colossal vault was there thrown over aisles up to 72.2 ft. span. Thus at Gerona near Barcelona. S. Cecile at Albi has about 59 ft. span, the Cathedral at Toulouse about 62.8 ft., and S. Jean at Perpignan 59.0 ft. While these are churches with a single aisle, the central aisle of Palma in Majorca is 62.8 ft. wide with side aisles almost 32.8 ft. wide.

b. Cross Section of the Parish Church.

1. Basilicas.

8. Diversity of Parish Churches with several Aisles.

While with a single aisle, every attendant in the devout assembly could see and hear the clergy at the altar as well as in the pulpit, which was then attached to one of the side walls, this possibility was very much endangered in churches

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with three or more aisles. In the side aisles a great part of the believers see neither altar nor pulpit; this indicates an existing defect. Unless the architect seeks to remove this fault as much as possible, his building then violates the chief purpose of the design, the main point of the programme. For the parish church is not merely there, so that divine service may be celebrated and attended by the clergy, as in monastic and episcopal churches, but in order that the individual members of the community find it possible to be present at and follow divine service; in brief, that it is possible for every one to see the altar and to hear from the pulpit.

The middle ages therefore labored to satisfy this programme for churches with several aisles, and indeed in the following manner.

One way pursued by mediaeval architects consists in this, that the ^{side} aisles should be rather narrow in proportion to the middle aisle. In this manner, it was first arranged that a considerable portion of the community should not be restricted to the side aisles. On the other hand, the side aisles thereby became passages, monumental corridors, an arrangement corresponding very well to the requirements. For the believers do not visit the house of God at the same time; they likewise leave divine service at different times. The devout should not be disturbed by their coming and going. This might occur in the side aisles without attracting the attention; even
 10 loud noises were suppressed as much as possible. Moreover all sorts of objects could be placed there, such as confessionals, side altars, etc.; These were well arranged along the walls of the side aisles. On these subordinate purposes and as passages is also based the lesser height of the side aisles. If the side aisles were merely arranged as stately passages, then would the programme have received a truly monumental solution. But they contained the germ of misuse. When the community increased beyond the number, that could occupy the middle aisle, and the times were not favorable for a new and second structure, then the community increased in the side aisles and remained there without a view of pulpit and altar.

Another means of making the disturbing piers less injurious was for the architect to make them as slender as possible. In fact Romanesque pillar basilicas were built as unobstructed

as possible. It is an entirely erroneous assumption, that in the Romanesque period were built thick or even very thick walls and piers. For Germany, where the middle aisle had a wooden ceiling, no reason existed for this. On the contrary, one is astonished by the slenderness of the colonnades, the thickness of the clearstory walls, and by the skilfulness of the supervision, for bringing such a tottering architectural construction safely under roof. In fact, we frequently read that in adding the roof or shortly before this, when the clearstory walls were just finished, these fell.

9. Basilica at Limburg-on-Haardt.

One of the earliest and proudest columnar basilicas stood at Limburg-on-Haardt (Figs. 1, 2²). Can one conceive a better balanced design than the section shows?

Note 2.. After Geier, F. & R. Götz. Denkmaler Romanischen Baukunst am Rhein. Frankfurt-on-Main. 1846.

This Monastery Church at Limburg was founded by Conrad II, the Salier, in his family fortress. In 1080 and on the same day he laid the corner stone of the Cathedral at Spire, he likewise laid that in Limburg in the early morning. The church still exists only in ruins; but it also still presents a grand and spacious impression, proud and stately as any church elsewhere. It is nearly as large as the Cathedral in Spire. At most the contemporary Herzfeld in Hesse still competed in boldness of construction with this church of the Saliers.

Furthermore, how little at this time were buildings based on but a single scheme is shown by a comparison with the Cathedral at Spire. Here at Limburg is a purely columnar basilica, and there at Spire is a purely pier basilica. But we come later to the Cathedral of Spire.

The columns of the church at Limburg have massive bases, as large as we find in Saxony only after 1150, for example in S. Michael and S. Gerhard at Hildesheim. The shafts are strongly diminished, and largely projecting cushion capitals bear the plain arches. The window sills are horizontal, as in nearly all sandstone structures of German Romanesque art. Only in a later time are they splayed. The choir terminates in a rectangular ending without a semicircular apse -- one of the

earliest rectangular choirs.

In the Gothic period Limburg received a charming and ornamental bell tower at the southwest angle, which rises high and //at a small scale, as a peculiarity of the churches of that time. Since the vicinity is a real paradise, a trip to Limburg is more advisable than anywhere else.

The Limburg church is a purely columnar basilica with wooden ceilings, but with a vaulted crypt beneath the choir bay. These cross vaults without ribs are finely constructed. Men could vault well at that time. But how the vaults over the high middle aisle should be made secure was then unknown to the Germans; therefore they did not concern themselves with this. After Charlemagne the German lands on the Rhine, the Moselle and the Danube continually had to open new regions to Christianity and civilization, and to settle therein. Innumerable multitudes of men and abundant means streamed out of these primitive domains of German civilization toward the East. First to Saxony, then to Franconia, Austria, Thuringia, Brandenburg, even to Prussia, Esthonia and Livinia. It was then ordered to ever build new churches and cathedrals as rapidly and economically as possible. For this was especially adapted the basilica with wooden ceiling. For the solution of the problem of vaulting the middle aisle abundant means were required. These did not exist even approximately as in France, where the people only had to improve themselves, only to build their own churches, and they could employ all the wealth so inexhaustably supplied by nature for even more costly structures. Whenever the Romanesque architects of Germany had abutments, they used vaults. Therefore the crypts, the lower stories of the towers, the apses and crossings were almost always vaulted. On the contrary, to create buttresses at the clearstories was not done. Hence nearly all the clearstories are not vaulted! Only toward the end of the Romanesque period did they abandon their thin and tottering walls, carried up massive and heavy piers and then at once turned their vaults against the heavy clearstory walls. Also when about 1200 and on the basis of early Gothic French training, men began to vault for more safety from fire, the churches formerly with wooden ceilings, the Romanesque walls and piers were strength-

strengthened, and from this time date the usually very heavy walls of the Romanesque churches.

Note 3. From Heider, G., R. von Eitelberger & J. Hauser. Mittelalterliche Kunstdenkmale des Oesterreiches Kaiserstaates. Stuttgart. 1856.

Thus in particular appear the buildings of the "Rhenish transition style," like S. Cunibert at Cologne, Sinzig, Neuss and the like. These were erroneously looked upon as produced by a single inspiration, and the mixture of Romanesque with early Gothic forms was regarded as a "transition style." Every visit to the locality contradicts this opinion. Moreover the archives prove the later addition of vaults.

These state of S. Gereon at Cologne, that the vaults were completed in 1227:-- "In the 1227 th year of the incarnation of our Lord and in the octave of the apostles Peter and Paul were completed the vaults of the Monastery of S. Gereon."

Of S. Apostles, there has been preserved the statement, that the layman Albero superintended the vaulting in 1219;-- "At which time this church was vaulted by Albero, a layman and a religious man, managing this with great care."

For S. Cunibert, there succeeded two dedications, one in 1226 and the other in 1247. The first evidently relates to the church and the second to the later vaulting.

Of Great S. Martin there, it is stated that between 1206 and 1211, Budenger labored industriously in the church:-- "Budenger laboring faithfully in the building of the church." During this later rebuilding, the thick walls and piers first originated.

10. Cathedral (Minster) at Constance.

In Constance on Lake Constance remains another and still more slenderly constructed columnar basilica, the present Cathedral (Figs. 3, 4). It is hard to determine the date of its origin. Its cushion capitals of unusual form, which exhibit eight instead of four sides, recall the similar ones of the destroyed Cathedral at Goslar, which Henry III had erected after his entry in the year 1045 with his young wife Agnes of Poitiers. Since this Cathedral of Goslar was torn down at the beginning of the "art-loving" 19 th century and has only remained to us in drawings, no certainty can be secured,

whether it was still the structure of Henry III or a later one. The bases at Constance show corner leaves, a decoration that cannot otherwise be proved to be earlier than 1100. There has also been preserved at Goslar a baptismal font with the date of 1111, which is made like a similar octagonal cushion capital.

Therefore whether the Cathedral of Constance dates from the period of 1052 - 1068, as assumed, is the question. Its existing clearstory walls must certainly be later; the arches do not at all fit on the capitals and are still weaker and thinner than elsewhere. Its choir also ends in rectangular form.

11. Cathedral at Gurk.

Those Romanesque choirs that exhibit piers instead of columns, likewise show the strongest endeavor to make these as slender as possible, so that the interior may be as little obstructed as possible. The Cathedral at Gurk (Figs. 5 to 7³) presents such a pier basilica, such as was likewise particularly common in Cologne. (The great pointed arch of the transverse aisle was broken out afterwards; the original design had no transverse aisle). Broad, airy, and with the least possible use of material was this church constructed. The crypt is counted among the most extensive known and it is entirely vaulted. Also above the western entrance, a chapel like a gallery is covered by cross vaults. (A similar arrangement is found in most Benedictine churches of that time, as also at Herzfeld in Hesse).

15 12. Cathedral at Spires.

On the contrary, the vaulted new structures, that were erected at about this time or from 1180 onward, like the Cathedral at Worms and in part those at Mentz and Spires, where the buttress was not known, oppose the thrust of vaults by very strong walls and piers.

These three cathedrals have presented great problems in view of the date of their origin. They are held to have sprung from the 11th century, including their vaults. But von Quast⁴ had already contested this estimated date on good grounds, yet without being able to produce entire conviction. Yet if one considers together all three buildings, then each affords evidence for itself, which is combined to securely fix the dates of all three structures.

Note 4. See von Quast. Nochmals Mainz, Speier, Worms. Zeits. für Chr. Archaeol. u. Kunst. 1856. p. 59 et seq.

If the oldest cathedral be first considered, that at Spire, (Figs. 8 to 10⁵), it becomes evident at once, that it dates from two entirely different periods. Choir and transverse aisle are entirely separated in the interior from the longitudinal aisles. And the choir and transverse aisle are plainly much more developed than the longitudinal aisles, therefore being later. Hence the eastern portion is certainly no longer from the time of Conrad II, the Salier, who laid the corner stone in 1030.

Note 5. After Geier & Görz.

That the longitudinal aisles cannot be entirely of the time of Conrad is shown by the rich dwarf gallery of the clearstory, which entirely equals that of the transverse aisle. Consequently the dwarf gallery of the clearstory only originated together with the eastern end. Since with the existing clearstory vaults, the dwarf gallery of the longitudinal aisle with its course could not have been introduced later, then the vaults of the clearstory likewise only originated when the eastern structure was built.

When one has progressed thus far in knowledge, he then sees in this matter, that besides their columns only the vaults are there; that the basilica from the time of Conrad remains entirely preserved in the existing cathedral, if all vertical projections internally be removed with their small columns, together with the external dwarf gallery and the wall inside it with its little windows. The Cathedral of Conrad was a basilica with wooden ceiling and plain clearstory wall, in which was arranged a continuous row of windows. Therefore these windows are now set unsymmetrically in their enclosing arches, since they existed earlier than the divisions of the vaults. The old Cathedral at Spire was a basilica, like that at Limburg-on-Haardt, for which Conrad laid the corner stone in the early morning of the same day, when after a rapid ride to Spire, he laid the corner stone of that cathedral at noon.

The vaults of the side aisles were also evidently added later, likewise with the strengthening of the old walls internally and then extending them higher.

That the vaulting of this cathedral did not result from a native development is shown by the antique capitals of the richest execution, particularly in the transverse aisle, which support in a truly French manner mediaeval plain forms above the curved antique abacus. The German master could see about 1140 this Renaissance as well as the vaults everywhere in France; but on account of the gallery of small columns, he must have undertaken the rebuilding after 1150, at earliest. Likewise in the transverse aisle, the old structure still exists in the crypt, which exhibits three windows, whose enclosures were strengthened by the new architect, in order to carry on his elevation with but two axes.

Since a great fire in the cathedral in the year 1159 is mentioned, then must the new construction and rebuilding described have occurred after 1159.

After this result, if one observes the choir of the Minster of Strasburg, he will find the very peculiar bell capitals, which in the cathedral of Spire are placed at the mid-height of the shafts of the columns beneath the transverse arches, but they recur in Strasburg in a modified and more intelligible form as rings around the shafts. The Strasburg choir also dates from the second half of the 12th century.

13. Cathedral at Mentz.

If one be soon certain at Spire, that the original church had no projecting pilasters and no connecting arches internally, but merely the usual plain wall, then the cross section of that at Mentz does not show the earlier structure so plainly. Other aids are here available for showing, that likewise in Mentz no vaulted construction precedes the 11th century.

That the western choir and the transverse aisle belong to a later time, like the choir and transepts at Spire, is clear. This is particularly shown by the exterior. If one passes through the interior, it is evident that the clearstory exhibits ribbed vaults of very developed form, a very certain indication of the end of the 12th century or the beginning of the 13th.

If the walls of the aisle are old, then these vaults were added later. There might have been Romanesque cross vaults earlier, since those now existing do not properly interpret

the semicircular enclosing arches. This objection cannot be avoided. If the bases of the piers of the middle aisle and those of the external walls be examined, it is then found, that both are entirely different. Those of the middle aisle are very high, those of the external wall being low and widely compressed, like the Gothic. Likewise the columns of this external wall already exhibit one or the other early Gothic volute capitals. These external walls of the side aisles with their vaults are later than the clearstory walls and date from the time of the ribbed vaults in the clearstory. Consequently, if the building already earlier possessed a clearstory vault, this with the vaults of the side aisles and the external walls must have fallen to the ground together. Yet these are explanations, which do not much concern the existing structure, since only the lower part of the clearstory and the eastern choir were old.

If the traditional dates be considered, the last consecration is found to have occurred in the year 1289 with great pomp and in the presence of all the suffragans. At least this concerns the entire western building, whose choir with its three apses is a both remarkable and fresh invention. The gable of this western transverse aisle also is well suited to that time. It is further stated of the great fire in the year 1191, that many books and other things of value with many charters were destroyed, and that in removing them, much was stolen, the cathedral cannot possibly have had then its existing or similar vaults over its aisles. For what would burn on the present cathedral excepting the roof? The burning roofs could not harm the vaults at all. These vaults date from the time after the fire of 1191. Until then the cathedral had wooden ceilings. Its vaults are thus later than those at Spire and Worms; this is also proved by their rich ribs and cross arches.

The numerous earlier fires may be left out of view for the existing cathedral structure. For even the eastern building, on comparison with other similar structures, makes no longer any such impression of age. Its two round towers by their external ornamentation strongly recall the western towers of the Cathedral at Treves. And these are of 1121. Thus when an earlier great fire of 1081 is mentioned, this eastern por-

eastern portion must at the earliest date from after that fire.

What the name of Ass' tower, borne by one of these western towers means has been very simply solved by all investigations made and by assertions. The hoist for materials in the middle /9 ages was called an "ass" (Esel), because it was operated by an ass. No loaded ass traveled up the narrow and winding stairway. Thus the old tower on Regensburg Cathedral is also called the ass' tower. Also in gold and silver mines the hoist is named "the golden ass." When this expression was unknown in later times, it has usually been stated, that as a beginning of mining a golden ass' colt was found with the inscription:-- "My mother lies near by." By excavating further and searching for its golden mother, mining originated. Thus at Reichenstein in Silesia and at Kuttenberg in Bohemia.

Likewise the date of origin of the Cathedral of Mentz here worked out is the only one possible. In this way it is correctly arranged with those of Spires and of Worms. On the other hand, the fires also ceased with the existence of the vaults -- an entirely consequent phenomenon --, while with the acceptance of a vaulted structure in the 11 th century the impossible circumstance occurs, that the cathedral burns down in spite of the vaults.

14. Gothic at Worms.

The Cathedral at Worms (Fig. 14) appears to have the least doubt concerning the time and mode of its origin. Bishop Conrad II (1171 - 1192) rebuilt the building at great cost, as it was threatened with a fall, and Archbishop Arnold of Treves solemnly consecrated it in 1181, together with Conrad and Bishop Ulrich of Spires.

In fact the interior appears as if it originated at one inspiration. The vaults of the clearstory have ribs with the richest Gothic prolifes; only those of the eastern end are restricted to a simple rectangular form. The eastern end must have been undertaken first.

All these vaults appear to have been intended from below. It is next also to be investigated here, whether as at Spires, all columns and pilaster projections for the vaults were not first added with the latter, practically since the axes of the aisles seem to have been developed entirely as in Spires.

Only the dwarf gallery and the little windows in its rear wall are wanting. But the treatment of the cornice is the same from top to bottom, so that nowhere may be recognized two different hands. The Cathedral at Worms, as a new building, is a known imitation of the then just completed Cathedral of Spire, whose clearstory wall has retained the same system through the restraint, which the architect saw himself placed under by the existing clearstory wall of the old structure.

The ancient walls may be concealed in the external walls of the side aisles as well as in the western towers, is not to be denied. Otherwise its dwarf galleries likewise prove the date of origin to be after 1150 -- thus the consecration of 1181. Externally the Cathedral of Worms is a masterwork of the highest rank, whose splendid skyline, rich in towers, is attained by nothing else.

15. Cathedral at Bamberg.

The last heir of these three cathedrals on the middle Rhine is the Cathedral at Bamberg (Fig. 15)., and in Hesse is found a true offshoot of Worms cathedral; the Foundation Church at Fritzlar (Stiftskirche).

The Cathedral at Bamberg owes its founding to Henry the Saint and his wife, the holy Kunigunde, in the year 1007; it was consecrated in 1012. Nothing more of this structure is to be seen; it burned down in 1081. About 1127 and under the apostle of Pomerania, the holy Bishop Otto, the cathedral was built in the richest manner and covered with copper. It existed in this form until 1185, in which year it again burned.

About this time probably, Bishop Thiemo had it torn down and commenced to build the now existing cathedral (Figs. 16, 17). This was at first not designed for vaults, since the clearstory vaults rest directly before walled-up windows, and the corbels for the cross arches of the vaults and ribs were added afterwards. In spite of all this, these clearstory walls with their arches and rows of piers already exhibit pointed arches and early Gothic capitals. The design was changed during the construction. The eastern choir exactly corresponds to that at Strasburg and likewise originated about this time. The Bishop imposed taxes already in 1201 for its two adjacent

towers. The western tower then dates from the time before 1237, in which year the entire cathedral was commenced. To this period also belong the finest masterpieces of sculpture to be found in Germany: Mary and Elisabeth in the interior of the eastern choir and the "Church" and the "Synagogue" outside the princes' doorway. Likewise from the building period after 1187, the screens of the eastern choir and the doorway belonging to them already exhibit sculptures meriting consideration. The western towers are like those of the Cathedral at Laon, the architect plainly learned his art there; even the cows of Laon exist in Bamberg.

16. Lack of Buttresses and Flying Buttresses on German Buildings.

All these churches have neither buttresses nor flying buttresses; they resist the thrust of the vaults by thick walls alone. By these groups of buildings, as by the later vaulted Romanesque basilicas, that should represent the "transition" style, the German architects became accustomed very commonly to work without buttresses. One of the best known later examples is presented by the Cathedral at Magdeburg. But this omission always requires very massive piers internally between the middle and side aisles; which obstruct the view from the side aisles; then the side aisles can only be utilized as monumental passages.

The transformation of the rows of supports beneath the clearstory walls here described in the cathedrals, likewise occur in those of parish and monastery churches, since their origin is due to structural reasons.

22 The parish churches of that period have very seldom remained to us; the first designs were mostly built of wood; only the richly endowed cathedrals and monasteries could at first erect stone structures. On the other hand, they were small, so that the flourishing cities sooner tore down their old parish churches in order to erect larger ones, which they only vaulted later with great difficulty. But here and there such early Romanesque churches with wooden ceilings have been preserved and have been most charmingly and lavishly vaulted. Thereby have been produced jewels of art, as at Sinzig and Linz on the Rhine. The side aisles also there become mere passages; but

they are so narrow, that they become suited to their purpose. They afford convenient and stately corridors for believers passing in and out.

2. Hall Churches.

17. Hall Churches.

When in the high and the late Gothic periods, men completely mastered the vaults and their thrusts, the piers in the interior were again made as slender as possible, and the eye of the architect fell upon the slender pillars of the hall churches, suggesting iron columns, that supported the airy vaults and scarcely obstructed the view of the community towards the altar and pulpit.

Then in plan as in their cross section, these churches experienced an entire transformation, and they show how the mediæval architect carried to a new and extremely characteristic solution the problem of creating a shelter for great multitudes of men.

The cross section of these churches first exhibits a great transformation. This is no longer basilican for much the greater number of parish churches; the middle aisle is no longer higher than the side aisles; all three aisles have the same height. These parish churches have become "hall churches."

22 18. Church S. Elisabeth at Marburg.

The form of the hall church is indeed no invention of the high or late Gothic; for the early Gothic already exhibits a goodly number of hall churches. There before all is the famous Church S. Elisabeth at Marburg (Figs. 18 to 21⁶), the corner stone of which was laid on August 14, 1235.

Note 6. From Moller, G. Denkmäler der deutschen Kunst. continued by E. Gladbach. Darmstadt. 1815 - 1845.

It is built over the tomb of the sainted Landgravine, that stands in the north transept. But since this is placed without any accord with the main axis of the church, the original tomb was evidently in the little Franciscan monastery church, in which she was buried, and over which was built the new church. The compound pier above the tomb does not commence on the pavement, like the others, but only on a corbel above it. In spite of the great reverence of the people and although the brother-in-law and former oppressor of Elis-

Elisabeth took in hand the erection of the church; the construction progressed very slowly. For yet 100 years later and with the presence of Charles IV in Harburg, he proceeded to have the towers completed.

However, the church makes an entirely unified impression. The architects have most faithfully adhered to the original plan. On the exterior it is first striking, that the church is built in two stories, while the galleries in the interior are wanting. The exterior in two stories was then the fashion in many churches of northern France and Brabant; as the vestige of the design with galleries. Evidently men dared not yet to open one window alone. Externally two galleries extend beneath the windows, an arrangement particularly suited for repairs.

A similar arrangement in two stories is shown by the Church Liebfrauenkirche at Treves and by S. Yved at Braisne near Soissons. The Church S. Elisabeth presents in the interior nothing of the airiness of the hall churches: close spacing and plain piers disfigure the interior. The middle aisle is considerably wider than the side aisles, so that the thrust of the middle vaults injuriously affects the piers.

Otherwise S. Elisabeth's Church contains a great number of masterpieces in windows with old glass and in sculptures. The Gothic rood screen next the choir is also preserved.

19. Cathedral at Eu.

The Cathedral at Eu (Figs. 22, 23⁷) exhibits the converse appearance in regard to two stories. At S. Elisabeth's, the church externally appears in two stories, but the Cathedral of Eu internally. While for the former this was a vestige or a fashion, as already stated, there must have been a change here in the design during its execution.

Note 7. From Archives de la Commission des Monuments Historiques. Paris.

Likewise the Cathedral of Rouen shows the same omission of the galleries after the completion of the rows of piers.

20. Old New School (Altneuschule) at Prague.

The Synagogue at Prague, the Old New School (Fig. 24⁸), which is in two stories, presents in its longitudinal section a hall cross section with three equal aisles. The date of

its origin is not given; yet the forms are suited to about the beginning of the 13th century. The internal piers are plain octagonal; the ribs and cross arches spring from corbels; a very suitable interior. The external walls exhibit on each axis two windows with a middle pier, against which abuts an intermediate rib of the vault. This treatment of the side aisles is found to be common later; thus on the Cathedral in Magdeburg and in the Sand Church at Breslau; thereby result cross vaults in five parts.

Note 8. From publications of Vereins Wiener Bauhütte, etc. Vienna.

21. Further Hall Churches in Germany.

Other early Gothic hall churches are found at Bozen, the city Parish Church; Essen, the Minster Church; Friedberg (Hesse), the Church S. Mary; Hameln, the Parish Church, which was transformed from a Romanesque basilica into an early Gothic hall church; Cassel, S. Martin's of about 1320; Kolin, the city Parish Church (body); Lippstadt, the Foundation (Stifts) Church; Meissen, the Cathedral (this was commenced as a basilica); Methler, near Dortmund; Minden, the Cathedral; Nienburg, (Anhalt); Ober-Marsberg, the Foundation Church and S. Nicholas; Osnabrück, the Church S. John; Paderborn, the Cathedral; Rostock, S. Nicholas; Soest, S. Martin zur Höhe; Wetter in Hesse and Wetzlar.

22. French Hall Churches.

In France, the Cathedral at Poitiers (chiefly between 1162 and 1204) preceded with a good example. Yet in France as in other countries outside Germany, hall churches occur very rarely; they may be termed a German peculiarity.

Did they also originate in Germany? This is difficult to prove. But few churches are to be found in the Romanesque period; thus the Church at Meverde near Brunswick and the Chapel S. Bartholomew at Paderborn.

Properly most crypts are also hall churches. In any case Anjou and Poitou made this discovery, Germany justly contesting it. One of the most charming internal perspectives of such hall churches is afforded by S. Serges at Angers (Fig. 25⁹).

Note 9. From Dehio & von Bezold. Die Kirchliche Baukunst des Abendlandes etc. Stuttgart. 1884 et seq.

27 23. Advantages of Interiors of Hall Churches.

28 The hall church fulfils the programme of the parish church far more correctly than the basilica. For if one does not regard the side aisles as merely passages or only use them as such, and if these side aisles are likewise arranged for occupation by the worshippers, then is given to these believers in the side aisles of the basilica less air space than to the usually more wealthy occupants of the places in the middle aisle. Equal rights and equal air for all!

But the basilican section not only contains in itself an injustice towards those, who remain in the side aisles; it does not have the stately effect of the hall church, neither in the interior nor externally.

The interior of the basilican church is naturally much smaller and more divided than the hall interior. The internal piers must then support the clearstory walls and therefore be thick and strong, while the piers of the hall have to merely carry the weight of the vaults and of the roof. Light, airy, spacious and pleasant is the effect of the interior of the hall church. In Germany, it has been built again and again with inspiration. Men have indeed transformed many Romanesque basilicas later into late Gothic hall churches. This change from the Romanesque basilica into Gothic hall churches may be studied best in Goslar and Brunswick. -- Even if only the choir was added to a Romanesque basilica in the late Gothic period, as at the Parish Church in Lippstadt, the basilican scheme was abandoned for the hall form.

There were not merely hall churches with three aisles; they were frequently constructed with five aisles. Thus the Church S. Maria at Herford and Church S. Severus at Erfarth. The latter is especially surprising by the slenderness of its internal piers.

The later German middle ages were plainly satiated with the basilica; at least the 15 th century preferred the hall church almost exclusively. It was left to the modern period to either regard the basilica as the sole Gothic architectural form, or to consider it as the only advisable treatment of the church, especially for Catholic churches. Both are erroneous, for both views lack the consideration of all mediaeval architecture.

If the former be merely an error in the books, that causes no mischief, then the almost exclusive use of the basilica for modern Catholic church buildings does not permit this to be derived from other than an attempt at an archaeological reanimation, in which nearly everything is wanting, that men are justified in requiring. A great portion of the believers have no view whatever of the altar and the pulpit, and the clergy never see a third of those present. The whole lacks suitability as a generating basis. Thereby the germ is wanting in the new treatment for an advance in the art. Furthermore, since the modern buildings are mostly lacking in scale, for all possible cathedral details and arrangements have been transferred to the small dimensions of the parish church, then the purposeless parts taken from mediaeval buildings are not even beautifully reproduced, they are dwarfed. And since the dwarf has a repellant effect, because in his smallness he shows the same purposes as the adult man, while the child exhibits proportions quite different from the adult, the effect of these dwarfed cathedrals is at most never beautiful. The stunted details never have even the basis of Renaissance details, namely beauty in themselves, and like that, they are only used without and against necessity. This procedure is not mediaeval; but it corresponds to the ideal of "art without knowledge." However, that art is not to be created without science is shown by these modern structures.

24. Exteriors of Hall Churches.

As the interior of the hall church far excels that of the basilica in dimensions, in convenient vision and equal justice, then has the exterior of the hall church its insufficiently esteemed advantages. Its exterior has an effect far more massive, prouder and more dignified, than the relatively small and puerile view of a basilica. If the basilica in a village, in the small city or as a monastery church in the open country lacks picturesqueness, grace, and an appearance as if belonging there, then in the midst of the lofty houses of larger cities -- even those of the middle ages -- it generally looks small, stunted and undignified. Furthermore, the flying buttress is not to be recommended for our climate. Frequent repairs become necessary. Its calculation, its

form and correct location are determined with difficulty. It prepares for posterity nothing else than care.

All this disappears for the hall church. If the aisles are of equal width, then is the thrust of the middle vaults neutralized and only one-half the outer vaults press against the buttresses. The buttresses are therefore easily determined and project relatively little. Everything lies under the protection of the great roof, and proud, massive and dignified, with height equal to that of the middle aisle of the basilica, this hall church towers above all citizens' dwellings, and at a distance enthrones itself high above the entire city.

If in remembrance of the basilica, the middle aisle be made wider than the side aisle, then one takes on himself all the evil results of the imitation of a bad idea. The middle vault shows over the high piers and crushes the vaults of the side aisles. One then requires all possible artifices and very strong buttresses. Even the lighting of the middle aisle is not favorable.

25. Cost of Hall Churches.

Is the hall church then more costly than the basilica on the same ground plan and for the same height? Not at all, for on the contrary it is cheaper. A comparison of the volumes of the masonry shows this clearly.

If one naturally compares the superficial area of a basilican cross section with that of a hall church on the same ground plan and with the same height of the middle aisle, obtaining therefrom the internal volume of the church, then has the hall church a considerably greater internal volume than the basilica. If the same unit price be assigned to both interiors, then is the hall church very much more costly than the basilica. But this is erroneous. As already stated, the hall church is much cheaper than a basilica for the same plan. This is not generally considered in competitions. One proceeds more erroneously, if an interior with a single aisle on the same plan be calculated at the same unit price per cubic foot of enclosed space, as for the basilican interior. The interior of a single aisle is in itself cheaper than the hall church, since the cost of two rows of supports and all their connections is omitted; compared to the little basilica, it

is still considerably cheaper, in spite of its much greater volume of air.

26. External Development.

Then returning to hall churches. The weak point is their external treatment. The churches are short in comparison to their breadth. The tower must have very large dimensions; it should be able to assert itself beside high buildings and the great roof. This is no fault in itself; on the contrary, our modern slender towers cannot maintain even an approximate comparison to the giants of the middle ages; but the means for the building do not usually permit this. The most beautiful solution of the roof was also found by the first architect of a German hall church. On the Church S. Elisabeth at Marburg is only arranged a longitudinal roof over the middle aisle; on the other hand, over each two bays of the side aisles is placed a small separate roof at right angles to the main roof. (The existing division of the roof does not correspond to the lower axes and it dates from a later and unintelligent time.).

Still more imposingly has this kind of roof been treated later by introducing a gable over each axis and before the roofs of the side aisles. Thus particularly in Brunswick, Breslau and Vienna.

27. Cathedral S. Stephen at Vienna.

One of the grandest hall churches is S. Stephen at Vienna. (Figs. 26, 27). The eastern end of this church is one of the first properly arranged hall churches in Germany, for all three aisles are of equal width. Its internal piers and buttresses are therefore relatively very slender, even if the later Bohemian and Thuringian hall churches surpass it in this respect. The architect of the nave -- the corner stone was already laid in 1359 -- sought to treat the interior still more freely, for he increased the axes to nearly 32.8 ft. But since he raised the middle vault higher than the side vaults, it is then dark and its weak tympanums do not look well.

Likewise the extremely high roof does not have the best effect. Though a gable is constructed over each bay of the side aisle, behind this being arranged a separate roof, the longitudinal roof extends alike over all three aisles, instead of over the middle one alone. The towers were begun in 1400 and

the south tower was completed in 1488. The ground plan certainly presents nothing characteristic of a bishop's cathedral; neither do the long choir stalls come in their own right nor are the many side altars in effect.

The plan of S. Stephen with three choirs is therefore of interest, since it is earlier than the similarly treated ground plans at Prague (Church S. Emmaus and Tein Church: see the ground plan in "Treatment of the Altar Apse", Art. 77), at Glatz, so that in spite of the residence of the emperor in Prague, the latter was then already dependent upon Vienna in Art. The Czechs appear in a notable manner not to have been gifted in architecture, since both cathedral architects, Mathias of Anas and Peter Parler, were likewise not Czechs, and further the later and well known Bohemian architect Benesch von Laun was from Pisting (in Austria).

28. Church S. Urbain at Troyes.

The predecessor of S. Stephen might be the Cathedral of Regensburg, whose southern aisle was indeed already under construction in 1250.

The Regensburg Cathedral is usually referred again to S. Urbain at Troyes (Fig. 38), since the ground plans of both churches are almost entirely similar. Pope Urban IV was the son of a cobbler in Troyes, and he founded on the site of his father's house in 1262 a church, that the architect John the Englishman (Anglius) constructed.

S. Urbain in Troyes is thus later than Regensburg Cathedral. For that the energetic construction of the new cathedral after the burning of the old cathedral in the year 1278, could not be counted upon before the beginning of the new structure, is shown by the archives, and particularly by the architectural forms themselves. Besides the ending in three choirs is already found in S. Jacob, the Romanesque Scotch Church at Regensburg. And it was likewise at home in the Romanesque art of Austria, as shown by the Cathedral at Gurk (Fig. 6).

Gurk also possessed the ground plan so especially preferred later in Austria, in even greater purity, since it formerly had no transverse aisle and was only a simple longitudinal structure, like all similar later churches in Prague, Breslau, Glatz, etc.

29. Church of Cistercians at Zwettl.

Yet let us further consider the hall churches.

The rebuilding of the choir of the Cistercian Church at Zwettl (Figs. 29, 30¹⁰) was begun in 1343 and it was consecrated in 1348. This choir shows the ground plan of Pontigny, which likewise reproduces the usual cathedral end in simplified form. Instead of the polygonal chapels are arranged those enclosed radially, so that externally occurs a common enclosing wall. Yet the architect of this choir -- Johann -- cannot be regarded as a predecessor of Peter Parler at Prague; for he employed the accepted choir scheme without working it out consistently. At least the flying buttresses are superfluous, since the walls between the chapels externally represent sufficient buttresses. (In the section given in Fig. 29, an erroneous impression is given, that these division walls are perforated.). On the contrary, the well aimed procedure of Peter Parler, which we shall see on the choirs of Kolin and of S. Barbara in Kutteneberg, first win complete justification on this ground. On the other hand, the architect Johann may commend himself for a different architectural idea.

Note 10. After Wiener Bauhütte etc.

Here is developed for the first time the ambulatory as a hall. Thereby the arcades surrounding the choir also become as high as the middle aisle. For this end, they must be made approximately as wide as the axial length of the nave; otherwise piers would stand too close, with between them only very narrow and slit-like openings. Therefore in hall churches, at most three arches enclose the choir as here, or usually but two.

Master Johann was a skilful artist, who created a noble interior.

To surround the choir with the "hall" was done particularly in the Mark of Brandenburg and in the adjoining brick regions with greater preference. Such noble choir solutions are there found everywhere. For example, there originated the famous Church S. Catherine at Brandenburg (Figs. 31, 33¹¹) between 1395 and 1401; it is the true example of an expensive church of that period. The choir comprises the last two bays of the nave and is raised by several steps; the remaining nave is about 121 ft. long and affords correct dimensions for the preacher.

In contrast to Zwettl, the buttresses are here internal, as Peter Parler first designed them, and they are also perforated. The piers between the aisles are thick, in contrast to sandstone regions, particularly Bohemia and Thuringia, hence the clear width of the hall does not appear as elsewhere. These architects in brickwork had remarkably little confidence in their materials.

Note 11. From Adler, F. Mittelalterliche Backsteinbauwerke des Preussischen Staates. Berlin. 1860 - 1869.

The other hall churches in the Mark have much plainer piers, not to the advantage of the whole. The architect of the Church S. Catherine was Heinrich Brunsbergh. The exterior exhibits for the first time those fanciful ornamental gables and blind tracery of glazed bricks, which became a particular characteristic of brick architecture in the Mark and a triumph for it.

The architects in the Mark have taken in a very reasonable way the peculiarities of the materials afforded by the province, especially bricks, as the starting point of their artistic creations. They have transformed in accordance with their purposes the forms of this material transmitted to them, and thus the reasoned style of architecture has again appeared here as the unfailing source of new creations in art.

That men could produce in brick airy ornaments much quicker and more certainly than in cut stone is shown by these buildings. Whoever had not at command the bronze stone of Strasburg Cathedral sees the lace-work in sandstone inevitably disintegrate, while brick lasts unchanged through centuries. The enemy of these fantasies in brick is insufficient mortar, and particularly cement, that most dangerous material for the modern constructor, generally objectionable.

31. Cathedral at Stendal.

Another and greater hall structure in the Mark is the Cathedral at Stendal (Figs. 84 - 86¹²). It was still under construction in 1424, as proved by a dispensation. As a peculiarity of that period, this cathedral exhibits two windows on each axis of the aisles. The Magdeburg Cathedral apparently furnished the model for it. Likewise we find the same twofold division in Ereslau, in the Sand Church, and in the southern aisle in Regensburg.

Note 12. From Adler.

The architects in brickwork of that time are a remarkable race. The feeling for beautiful mouldings and ornaments has become entirely lost to them, as if they had nothing of the kind. The swelling bases and the strongly projecting, masterly modelled capitals of Romanesque and early Gothic art have dried up into a few quite ugly and stunted courses of moulded bricks. The ribs are as thin as fillets and are awkwardly placed on the plain piers. Yet the interiors exhibit a conscious grandeur and very commonly a masterly treatment in general, so that it is difficult to combine both as the work of one artist. Even if the material may bear some blame for the weak details, this does not explain the nearly general ugliness of them.

32. Pilgrimage Church of the Holy Blood at Wilsnack.

The Pilgrimage Church of the Holy Blood at Wilsnack (Figs. 37, 38¹⁸) was completed about 1450, and it shows the ornamental blind tracery even transferred to the piers of the church. Its middle aisle is carried somewhat higher than the side aisles, as in S. Stephen in Vienna.

Note 18. From Adler.

33. Bavarian Brick Churches.

A second brick region in Bavaria has likewise produced numerous and great buildings; but like Silesia, it was not able to evolve an art characteristic of the particular material.

The Church of the Holy Ghost or Hospital Church at Landshut (Fig. 39) exhibits a both airy and stately hall structure, whose choir is also furnished with a hall ambulatory. Only a single pier terminates the middle aisle in order to extend the arches of the aisle around the choir. It was constructed in 1407 by Hans Stethaimer of Burghausen, "stonemason and superintendent of the building at S. Martin in Landshut," and it possesses charmingly designed stone vaults.

The two largest creations of Bavarian brick architecture are the Church S. Martin at Landshut, just mentioned, and the Liebfrauen Church at Munich (Fig. 40¹²), both also hall churches. The height of the aisles is quite extraordinary, with rather close spaced piers, the Liebfrauen Church has about 118 f. in clear height. Its architect was Jörg Gangkofer of Halsbach or Polling. Duke Sigismund laid the corner stone for its re-

rebuilding in 1468.

Note 14. From Dehio & von Bezold.

34. Parish Churches of Square Plan.

Since for the assemblage of a community for parish divine service a too elongated interior was not at all desirable, then were created merely square plans. These are then extremely practical. The high altar and the pulpit are visible everywhere. If the latter be attached to an internal pier, then may the people gather at equal distances and as near to the preacher as possible. Likewise the two prescribed side altars, that are to be placed in every parish church, could be seen from all the seats. The square plan is an ideal solution of the programme of the parish church.

Such churches are, for example, S. Martin zur Wiese in Soest and the Frauen Church at Nuremberg (Fig. 41). The latter was built by permission of Charles IV on the site of the Synagogue. As architects are mentioned between 1355 and 1361 Georg and Fritz Rupprecht. The church was first consecrated with two altars in 1358, the altars of Our Lady and the choir in 1360. We shall return to this church in Chapter 6 (in the description of the "development of the western end.").

28 Yet more compact is Church Heilig Kreuz in Cracow (Fig. 42).
A single column supports the vault, a very charming solution. It originated about 1500.

35. Churches with two Aisles.

In many regions are preferred churches with two aisles. They afford interiors both easily seen and picturesque. The row of columns along the middle disturbs the worshippers very little or not at all, since a passage generally remains free in the midst. A graceful example is S. Martin in Steiermark (Fig. 43). This plan is found especially frequent in Hesse.

The largest design of this type is the Dominican Church at Toulouse (Figs. 44 to 47¹⁵). Its row of columns has a height of 68.9 ft. and each of the two aisles has a span of 29.5 ft. It is a brick structure of the plainest construction.

Note 15. From Dehio & von Bezold.

40 3. Parish Churches with a single Aisle.

36. Simple Parish Churches with one Aisle.

The third solution of the programme of the parish church is

that with a single aisle. It is the most ancient and the simplest solution. Yet for larger extent it possesses bold spans of vaults, and by these men were apparently and generally alarmed in the middle ages, excepting in the regions north and south of the Pyrenees. Yet today, since the vaults and their abutments may be simply and safely determined, these designs commend themselves as the best.

They compete for the palm with the hall churches, concerning a happily arranged plan for parish churches, and in regard to the external appearance, as well as for suitability and cost, these certainly win the victory over them.

In plan they naturally present no obstruction to seeing the altar and pulpit from all places. They even excel the hall churches in this respect. Since the aisle must be wide -- 49.2 to 65.6 ft. -- in order to receive the community, sufficient space exists at the eastern end for all three altars. The three altars -- the high and two side altars -- were in use there from ancient times, being required for the Catholic churches from the Council of Trent.

One of the most charming and most successful solutions of such an eastern end with three altars is shown by S. Saturnin in Pampeluna, which dates from the middle of the 14th century. S. Vincent at Carcassone (Figs. 48 to 50¹⁶) solves the problem in a different and equally skilful manner.

Note 16. From Dehio & von Bezold.

Since these great vaults require massive buttresses, there naturally resulted between these chapels for altars and other church requirements, such as confessionals, etc. Men could even perforate the buttresses, making a passage through them and produce a similarly picturesque effect by columns set beneath them, as that afforded by the three aisled basilica. This plan has been especially developed by modern evangelical church architecture.

This is shown most beautifully by the Church at Manresa in Spain (Figs. 51 - 53¹⁷), which was begun in 1328. The simplest plan with a single aisle and full utilization of the spaces between the buttresses as chapels is exhibited by S. Justo y Pastor at Barcelona (Fig. 54¹⁸), begun about 1245. Elsewhere similar to it is the famous Church S. Maria del Pino

in the same city; the former has a span of 45.9 ft., the latter one of over 52.5 ft. Of still greater span is the Church on Monserrat (Fig. 55¹⁸).

Note 17. From Dehio & von Bezold.

Note 18. After Graus. Eine Rundreise in Spanien. Wörli's Reisebibliothek. Würzburg & Vienna. n.d.

One of the early predecessors of the single aisled churches of eastern France from the 12th century is Saintes-Maries in the department of Bouches-du-Rhône (Fig. 56). It is covered by a somewhat pointed tunnel vault, which is strengthened by cross arches.

The French "Saintes Chapelles" (holy chapels) are in particular splendid examples of churches with a single aisle. They show that dryness and tastelessness are not essential properties of single aisled churches, and that the northern France Gothic in its freshly youthful greatest strength and finest period of development has created in them the loveliest examples and models for churches of a single aisle.

The best known and finest S. Chapelle is that of the Palace of Justice in Paris (Figs. 57 - 59¹⁹), begun in 1242 or 1245 and completed in 1247, which was erected under S. Louis by the architect Pierre de Montereau to receive a portion of the crown of thorns.

Note 19. From Dehio & von Bezold.

Its successor shortly after 1250 is the chapel that was added to the Romanesque Church S. Germer (Fig. 60²⁰), and which belongs to the most exquisite creations of Gothic.

Note 20. From Archives de la commission Historiques.

A second production by Pierre de Montereau was the Chapel of S. Germain-des-Prés at Paris, which was torn down at the beginning of the "enlightened" 19th century. There is still preserved the somewhat earlier S. Chapelle in the Chateau of S. Germain-en-Laye (Figs. 61 - 63²¹). All these chapels have about 29.5 to 32.8 ft. clear spans. The earliest of these must be that in the Archbishop's Palace at Rheims. This was perhaps completed in 1240. One of the latest chapels is that in Vincennes. All form masterly models for churches of a single aisle.

Note 21. From Dehio & von Bezold.

A charming example of a single aisled church is presented by the Hospital Church at Braunau in Austria (Figs. 64, 65²²). The architect has even completed within it a hexagonal central structure by the help of the gallery piers.

Note 22. From Wiener Bauhütte etc.

45 The Chapel S. Johann at the Parish Church at Imbach (Fig. 66²³) shows how charming and perfect is the internal effect of such churches with a single aisle. It dates from the 14th century.

Note 23. From Wiener Bauhütte etc.

37. Parish Churches with one Aisle and a Transverse Aisle.

If a transverse aisle be added, there results an interior, so grand, united and attractive, that those entering are forcibly affected and feel themselves elevated above little earthly affairs. Men may be influenced by space just as by music. They may be harmonized with earnestness or gladness, a festal or gloomy impression be produced, or be led to devotion or to secular matters. If unconstrained, men can never reject the mysterious charm of the interior.

Spain also affords the most beautiful examples of these. S. Pablo at Valladolid (Fig. 67²⁴) exhibits such a ground plan of the most thoughtful regularity. This church was begun by Cardinal Don Juan Torquemada and completed in 1468. Johann and Simon of Cologne must have been the architects.

Note 24. From Graus.

The Monastery Church El Parral at Segovia (Fig. 68²⁴) here shows the Cologne structure over the crossing with three choirs. (Great S. Martin and S. Aposteln). The vaults were completed in 1485.

A third solution of such churches of cross plan is presented by S. Geronimo at Granada (Fig. 69²⁴).

One of the latest branches of this type is to be seen in the very famous Church S. Juan de los Reyes at Toledo (Fig. 70²⁴), which Ferdinand and Isabella ordered to be erected in memory of their victory over the king of Portugal near Torc. In all these churches, the buttresses project inward as in the Mark of Brandenburg. They are the models of the Barocco churches.

38. Parish Churches with one and a half Aisles.

Finally, there are further churches with one and a half aisles, i.e., such that possess a clearstory and but a single

side aisle. This plan is found more frequently in the later monastery churches, as for example in the Augustine Church at Brunn (Fig. 71).

4. Churches with Galleries.

39. Galleries.

A fourth type, for assembling a larger number of persons in the least possible space, is the church with galleries. And the basilica, like the hall church and the church with a single aisle, may be furnished with them. In the Romanesque period, the basilica very commonly occurs with galleries. The use of galleries was probably derived from Roman art through the Early Christian art of the Franks, since the forensic basilicas were already equipped with galleries.

Only a few Early Christian churches with galleries are yet preserved; S. Vitale at Ravenna in Italy and S. Sophia in Constantinople, as well as S. Demetrius in Thessalonica, exhibit the most diverse solutions of such churches.

From the Frankish period, the Minster at Aix-la-Chapelle is the sole example; yet the written traditions state that galleries were already then preferred.

The best known Romanesque churches with galleries are:-- S. Ursula at Cologne, S. Patroclus at Soest, the Cathedral of Tournay (Doorsnik) and S. Remi at Rheims.

40. Cathedral at Limberg.

Of early Gothic churches with galleries, one of the finest in Germany is the Cathedral of Limburg-on-Lahn (Figs. 72 - 75²⁵). It was earlier a foundation church and was consecrated in 1235. This is the only date transmitted in reference to the existing structure.

Note 25. After Moller.

Limburg Cathedral shows a correct representation of the French transition style, which had already fully developed in the interiors of the churches of the Gothic scheme, yet had only commenced to transform the old Romanesque covering on the exterior. The Limburg architect was a German; for the external covering is not executed in French Romanesque, but in German Romanesque. So much the new Gothic invention had, that was tempting to all the German architects wandering there, and however much they at once yielded to these forms, the old

French Romanesque art offered nothing attractive to them.

These architects never brought back with them French Romanesque forms. They evidently felt that German Romanesque art was at least contemporary with the French, if not earlier.

But the French had invented the vaulting of the churches, to whose defects the frequent conflagrations made the Germans so perceptibly sensitive, and with the vaulting originated the pointed arch, the ribs and all the small columns supporting these cross, diagonal and side arches. This was such a desirable and logical invention, that no German could reject it.

This French transition or earliest Gothic style was combined in the grandest way with the German external covering by the Limburg architect. Moreover he has plainly retained from the old Romanesque the walls of the side aisles, as well as the substructures of the towers in part, the choir and the transepts, and thus originated all irregularities, of which one becomes conscious on a closer examination.

The interior was unfortunately marred by the supposed restoration of the old paintings. The colors occurring beneath the limewash were guessed at by the eyes of artists and restored. There were also naturally ignorant men in the middle ages, and not merely the work of artists has been preserved; but even the works of artists have received bitter injustice from the common acceptance, that the middle ages were bad, even if not crude. Whoever created this splendid exterior and conceived this interior of a jewel case, he has not made it unenjoyable by this miserable whitewash!

The exterior of Limburg Cathedral is constructed of quarried stone with cut stone details. The rough stone panels were plastered. During the restoration in the 19th century, the plastering on the western facade was cut off and the split stone masonry exposed. This occurred from the mistaken view, that surfaces were not plastered in the middle ages; that this plastering dated from a later time. On reviving the Gothic, men were everywhere of the opinion, that in order to build properly in mediaeval style, they should never plaster, but only construct with "genuine" materials. Had this error appeared later, then a notable remainder thereof has continued as particularly "genuine."

41. External Plastering in the Middle Ages.

In the middle ages rough stone was more costly than at present, since transportation was more difficult. It was then economized wherever and however this was only possible. Thus ⁵⁷⁷ the irregular edges and lumps of the different window jambs, ⁵² projecting vertical bands, etc., were allowed to project into the split stone surfaces; for they there disappeared under the plastering. This mediaeval plastering not merely abutted against the edge of a dressed stone, so that its surface lay in the plane of that of the dressed stone; it likewise as commonly or even more frequently, lay on the surface of the cut stone and was stopped around the window by a plain straight edge. This naturally occurred in curved form around the arches.

Thereby all irregular bonding of stones was concealed. The middle ages did not intend to show all such irregularities, which produce an effect more or less rude. One may investigate in Goslar the Church Neuwerkskirche or the City Hall, the cathedral in Limburg or Brunswick, and he will everywhere find, that these bonding blocks were covered by plastering, and to this end, they were dressed with the tooth axe, so far as they were plastered.

On structures entirely of dressed stone, for example on the Freiberg Minster, these edges of the rough stone were likewise retained, and their cut stone surfaces were intended for the coating -- both internally and externally.

Why is not everything held to be genuinely mediaeval and not genuinely Grecian!

It may be disputed whether the plastered surface or the split stone masonry appears most beautiful; but it is certainly ugly to fill the thick mortar joints between the split stones with stone spalls, like almonds in a honey cake. But the most objectionable is to "point" these joints with cement, since the cement joints fall out in split stone just as in dressed stone, daub and make these unsightly, soon rapidly weathering.

The word "lisene" (vertical projecting band) evidently refers to the smooth vertical bands of dressed stone between the rough split stone masonry, since "lisse" in French signifies smooth and "liciare" in Italian means smooth, so that this should be "lissene" more correctly than "lisene".

42. Cathedral at Laon.

In cross section as well as in the system of the longitudinal section, Limburg strongly recalls Laon (Figs. 76, 77²⁶). Even the design with seven towers indicates that cathedral.

54 Laon must then have exerted a great charm on the Germans; we also see its towers imitated in Bamberg and in Naumburg.

Note 26. From Archives de la Commission Historiques.

Nothing certain is to be obtained concerning the date of origin of the Cathedral of Laon. There is indeed mentioned a fire in the year 1112, which laid in ashes the entire cathedral during a battle of the citizens with their overlord, the Bishop; but it is impossible for the existing cathedral to be older than Notre Dame at Paris (begun 1163) or even than S. Denis near Paris. (Completed 1144).

Much rather will it appear, that the Cathedral at Laon is later than both, and therefore that the other given date is to be employed, according to which Bishop Walter founded two chapels in 1178, and that in 1221 the chapter, which had exhausted its means, sent seven canons and six prominent laymen from city to city with reliquaries of the cathedral, in order to receive gifts from believers for the rebuilding. Between 1178 and 1221 must the building have been chiefly erected.

The plan of the Cathedral of Laon presents the peculiarity, that it has a choir with rectangular ending. This appears to indicate English influence, since the chapter also collected in England for the rebuilding. Yet S. Martin at Laon already earlier had a square-ending choir. S. Martin was a Romanesque basilica with wooden ceiling, which, like our churches, later in the early Gothic period received its vaulting with all the compound piers. At S. Martin the rectangular choir abuts directly on the main street of Laon, so that one receives the impression, that this solution was compelled by the location.

55 That it was not invented in Laon is shown by our Romanesque churches, as for example, that in Limburg-on-Haardt of 1080. Whether Laon was on its part influenced by England can scarcely be proved now.

Moreover, this rectangular ending for the choir of the cathedral was not originally intended, as the beginning of the rounding in the interior of the choir still shows, and the excavations under Boeswillwald have proved.

The exterior of Laon cathedral exhibits an artistic originality, which is almost unique among French cathedrals. The solution of the towers is of particular charm and therefore was frequently repeated. We give a representation of them in Chapter 6 (with a description of the western facade). The design of the galleries is one of the grandest and most extensive after that of Notre Dame at Paris. Laon must then have possessed an extremely numerous population.

Still somewhat earlier and about 1120 was already erected the Cathedral of Noyon as a great church with galleries, and not much later that of Mantes.

43. Churches with Galleries in England.

Particularly favored was the basilican form with galleries in England at the time of the transition from Romanesque art to Gothic. One of the greatest designs is of one at Peterborough. Its predecessors apparently were the Norman churches in the time of William the Conqueror; S. Etienne and the Holy Trinity at Caen, which the royal pair had built in gratitude for the conquest of England; both were begun in the year 1066.

44. Purpose of Galleries.

These galleries served to stiffen the middle aisle as clearly shown, particularly when this was vaulted and very lofty, as in Notre Dame at Paris. But that the galleries were built on this account and not because their areas were required for the vast multitudes of men is naturally erroneous. The galleries are evidence that they were needed for the assemblage of the numerous believers, who could not otherwise be admitted at one time. The Roman basilicas with wooden ceilings likewise had galleries.

45. Hall Churches with Galleries.

In the late Gothic period, most elongated hall churches exhibit quite narrow galleries along the side walls, which more nearly resemble passages, that as such were already common inside and outside of early Gothic churches, in order to reach the windows and roof, and to wet everything in danger from fire, than actual galleries for receiving believers. Such arrangements were especially favored in Saxony, as for example in Pirna (Fig. 78²⁷), Schneeberg (Fig. 79²⁷), Halle and Zwickau (Fig. 80²⁷).

Note 27. From Dehio & von Bezold.

The like gallery passages are found in the single-aisled churches of southern France, thus in the Cathedral of Albi (see the adjoining Plate and Fig. 81²⁸). Its corner stone was laid in 1282 and the last vault was completed in 1382 under Archbishop Guillaume de la Voulte.

Note 28. From Dehio & von Bezold.

46. Century 13th. Middle Ages. 2nd. 13th. 14th. 15th. Cathedral of Albi.
On a colossal substructure rises a perfect fortress. Each buttress has become a small round tower. A defensive passage crowns the whole. The entrance leads through the likewise fortified sacristy. A single colossal vault covers the aisle 59 ft. wide, whose length measures 295.3 ft. It is a cathedral of the greatest importance, whose choir stalls are freely enclosed by late Gothic screens. It is built of brick, even to the tracery and the other architectural details. This *56* brick region, like the Bavarian and the Silesian, has also aspired to its own brick architecture. The particular material, with its peculiarities so different from dressed stone, has not become the source of new forms. Therefore the fame of the north German lowlands only shines the more brightly!

All mediaeval churches exhibit enclosed plans with quiet outlines and not those forms with projections, that modern churches introduced.

5. Central Churches.

47. Limited Distribution.

The central form of parish church was rarely attempted in the middle ages, yet always more frequently in the Romanesque, *57* than in the Gothic period. Still it was particularly suited to the requirements of such churches.

Taken as a whole, it is striking that the middle ages so seldom preferred the central plan, since a great model existed, that might easily have exerted a vast influence; the Church of the Holy Sepulchre at Jerusalem. We see in the most diverse points in the West the endeavor flare up, to erect circular churches in honor and memory of the Sacred Tomb. But this remains in these scattered sparks; for this form will kindle no general fire of the imagination. This plan appears to have concealed difficulties unconquerable by the mediaeval master, if large multitudes of men were to be received. For

a small number it might already be more easily constructed, and so we see it naturalized in certain countries as a plan for baptisteries.

48. Baptisteries at Pisa and Cremona.

Thus there remains in Italy a great number of such baptisteries. Their models are afforded by Early Christian art in Ravenna, for example; thus the Baptistry S. Giovanni in Fonte and S. Vitale there.

One of the best known and most costly of Italian baptisteries is that beside the Cathedral at Pisa (Figs. 82, 83). This is furnished with a side aisle extending around it and a gallery above this, both of which are covered by cross vaults. Over the central space rises a great cone, whose apex is truncated to permit a skylight. This is a somewhat unique covering and imitates the Holy Sepulchre in Jerusalem. The exterior of the Baptistry at Pisa is lavishly equipped with galleries of small columns, so excessively favored by the Italians of that time, which in the Gothic period also received a special ornamentation by gablets. According to an inscription, Diotalvi was the architect, and the building was commenced in 1153.

The Baptistry at Cremona (Figs. 84, 85 ²⁹) was begun in 1153 and executed entirely in Romanesque forms. The construction is very skilful; for the whole is covered by a great octagonal hipped dome; the enclosure thereof is very weak. This dome is entirely similar to Brunelleschi's cathedral dome at Florence. That the latter represents the beginning of the Renaissance is one of the "fables," which have become conventional." Not once are the details Renaissance, omitting then the construction.

Note 29. After Osten, F. Die Bauwerke in der Lombardei vom 7. bis 14. Jahrhundert, etc. Frankfurt. 1846 - 1854.

⁴⁹ S. Michel d'Entrailles in the French department Charente (Figs. 86, 87 ^{30, 81}) dates from the 12th century and together with S. Gereon in Cologne gives quite excellent and peculiar models for parish churches, that are extremely cheap, most appropriate, of great effect internally and externally, and they instruct us how the worn-out path of the basilica may be abandoned.

Note 30. From Dehio & von Bezold.

Note 31. From Archives de la Commission Historiques etc.

50. Minster at Aix-la-Chapelle.

The oldest and best known central building in Germany is indeed the Church S. Maria of Charlemagne; the Minster at Aix-la-Chapelle. Its architect was Odo of Metz. According to a manuscript of the 10th century in the Imperial Library at Vienna, thus runs the inscription in the lower part of the chapel:-- "This hall of great dignity was erected by the great emperor Charles. The famous master Odo brought it into existence; since he has lived in Metz, he rests in that city."

The art of Odo was no foreign and imported knowledge, but the climax of that art, which had further developed under the Merovingians on the basis of the never destroyed Roman civilization. In fact, the way in which the middle vault, an octagonal hip roof, is truncated is as surpassing as it is happy. The drum shows buttresses at the angles, so that the thrust of the hip dome is neutralized. Against the lower part of the drum abut the obliquely rising vaults of the upper aisle. The entire design was already under construction between 781 and 791, since Pope Hadrian in a letter of that year permitted Charlemagne to take marble and mosaics from Ravenna for the new structure. In 804, on the occasion of the presence of Pope Leo III, it was solemnly consecrated.

51. S. Gereon at Cologne.

S. Gereon at Cologne (Fig. 88), with its decagon as plan, certainly does not date from the Romanesque or Gothic periods. Where on the north side the masonry of the chapel is visible, it seems Roman and in fact tradition states, that S. Helena built this church over the well into which the bodies of the cohort of the Theban legion were thrown, and which Rictiovar had slaughtered in Cologne. Yet since the structure owes its present appearance to early Gothic in great part, S. Gereon also serves as a good example of what charming solutions may be found in mediaeval art, besides the exhausted basilica.

Archbishop Anno already in 1067 - 69 had one side of the decagon torn out in order to add a longer choir with a crypt. But he must have carried the structure on the decagon up to the height of this choir building and have built the vestibule.

Later in 1190 and 1191, the choir was lengthened, and the existing splendid apse with its two adjacent towers was erected in Romanesque forms, and the decagon was crowned by a dwarf gallery.

But the actual development of the decagon into the existing fine interior was only executed at the beginning of the 13th century in early Gothic forms. A decision of the chapter in 1219 exists, to rebuild the church, which threatened to fall. All members of the foundation presented certain gifts for the rebuilding during three years. The great central vault was then completed in 1227.

What a splendid interior has been produced by the aspiring compound piers with the galleries between them and the rich vaults, whose ribs unite in a massive pendant keystone, is evident to every visitor. How picturesque and rich would be the effect of the exterior, did not the existing ugly roof injure the whole, but it may be suggested, that a rich lobed dome with gables formed the proper ending in the style of that period. The rudeness, so readily ascribed to the middle ages, does not pertain to this.

52. Church Liebfrauenkirche at Treves.

The most magnificent central building of the middle ages is the Church Liebfrauen at Treves, the parish church of the Cathedral.(Fig. 89).

It is entirely constructed in the perfected early Gothic. An inscription on an internal pier states:-- "The erection of this church was begun in the year 1227 and completed in the year 1248." Even if this statement only dates from later centuries, it is worthy of credence, since a writing of the Cologne Archbishop Conrad von Hochstetten of the year 1248 is preserved, in which he commands all his clergy to solemnly receive the deputies from the Treves Liebfrauenkirche, and he recommends to the people, that they should aid them by alms, since the church "fell down on account of too great age, and it was beginning to arise anew in an ornamental and festal architectural style, and because their own means did not suffice for its preservation."

The solution of the plan is highly interesting in more than one respect. It does not exhibit as a starting point the us-

usual choir ending of the cathedrals with an ambulatory and chevet chapels -- a solution that would be readily suggested -- but the doubling of the choir ending of S. Yved at Braisne near Soissons, in which the chapels are arranged diagonally beside the high choir. S. Martin at Ypres, the Foundation Church at Xanten, S. Catherine at Oppenheim, and later the Church at Arnweiler, exhibit the same solutions of the choir.

This plan in the interior gives the architect opportunity for the most masterly alternation in the forms of the supports. From the sturdy piers beneath the clearstory walls to the rich compound columns at the angles, everything remains and combines splendidly. That the architect was a German must be proved by the omission of the flying buttresses. The Germans had vaulted so many Romanesque churches afterwards without adding flying buttresses, that they very commonly refrained from their use in purely Gothic works, as on Magdeburg Cathedral.

Both externally and internally, the Treves Liebfrauen Church was adorned by excellent sculptures. Particularly beautiful are the forms of men on the buttresses beside the main entrance, indeed being two evangelists and two patriarchs. They are the finest creations.

53. Other Central Churches.

That the central plan was not foreign on the Rhine is shown by the destroyed circular Church in Bonn, a baptistery given by Boisseree in his "Denkmälen der Baukunst am Niederrhein."; also by S. Gereon and by the Chapel S. Matthias near Cobern, that dates from the time shortly after 1200.

The simplest, most appropriate and cheapest solution of the plan of a central building is shown by the Church Karlsbofer in Prague (Figs. 90, 91⁸²). Its span of 68.9 ft. is quite considerable for mediaeval customs, with very slender buttresses only 3.28 ft. thick and walls of similar size. The star vault is very beautifully designed, and the entire interior is highly effective. It is likewise one of the most economical solutions, that can be conceived, and it is therefore recommended for modern purposes. How the architect solved the problem of the roof is no longer known; two elegant domes with Italian lanterns now cover the exterior.

Note 82. After Mitt. d. K. K. Centralcommission f. Erf. u. Erf. d. Kunst u. hist. Denkmäle. Vienna.

Furthermore, this expression "Italian lantern" is also incorrect. These are nowhere found as beautiful as in Germany, and nowhere as numerous. They are derived in this form from a German design.

The founder of the Karlshofer Church was Charles IV. He had laid the corner stone for a new Monastery of noble Augustinian canons in 1351 on a hill in the modern city of Prague, in honor of Charlemagne. It was commenced in his presence in 1377.

63 Since the emperor himself preferred a building of that form,
64 it may readily be assumed, that his cathedral architect Peter Parler was the originator; particularly since the choir shows a pier in the centre, a favorite arrangement of Peter Parler. In Kolin at least, the like arrangement is certainly derived from it, since its origin is proved by an inscription within and beside the door of the sacristy, as well as by an inscription in the cathedral. At S. Barbara in Kuttenberg may only the probability be shown, that Peter Parler was also there the originator of the design, and therefore of the buttress in the axis of the choir. The cornice and the general arrangement of the choir structure are entirely similar to that in Kolin.

Whether the Karlshofer Church should also be ascribed to Peter Parler is quite questionable, since general similarities are wanting. The Karlshofer Church is also not mentioned in the inscription above his bust in the Cathedral of Prague; certainly not the Church S. Barbara. Since the Teyn Church at Prague likewise shows the buttress in the midst, this must rather indicate a preference of the architect than to always refer to Peter Parler.

54. Cemetery Chapels.

In Austria during the Romanesque period, the central form was adopted in the small cemetery chapels. A great many of these are preserved. A very charming interior in transition style is presented by the Cemetery Chapel at Tulln (Figs. 92, 93).

How these circular structures appeared externally is shown by the corresponding Cemetery Chapel at Modling (Figs. 94, 95).

From the Gothic period has been preserved in Sedlitz near Kuttenberg a very graceful and skilfully designed Cemetery

Chapel of square plan (Figs. 96, 97); it originated about 1800. We here approach to that central development, which we described with hall churches, of which Church Frauenkirche at Nuremberg is the one most widely known.

Chapter 3. Monastery Churches.

As we have in the preceding followed the origin and the transformation of the plan of the parish church and of those structural parts and the arrangements, that come into the consideration of the parish church, then before going into its details, let us rather consider the plans of monastery churches and of cathedrals. The details of all these plans are treated similarly, and we shall later describe them together.

55. Members of a Benedictine Monastery.

The oldest order is that of S. Benedict of Nursia, who was born in 480. The Benedictine monasteries were to make possible to individuals to withdraw from the world, so that indeed the monks never had to leave the monastery, and all needs were fulfilled within the walls of the monastery. Since they could not satisfy all requirements of the great monastic family by means of the monks and lay brothers, they gathered there also a large number of lay families, who lived near the monastery and formed a small city there.

The monastic community always chiefly consists of two classes; the monks, who are priests, and the lay brothers, who are not priests but laymen. The latter are termed "conversen, barbati," etc. Both classes have taken the monastic vows, i.e., the vows of chastity, of poverty, and of obedience to a superior. Besides these members of a monastery, there are then also laymen with their wives and children, who are employed for the monastery.

a. Monastery Churches of the Benedictines.

56. Programme of the Monastery Church.

The general plan of the monastery was explained in the preceding parts of this "Handbook". it was reserved to here analyze the church.

Since each of the clergy had to daily offer the sacrifice of the mass and while fasting, the possibility must be provided for numerous priests to read the mass at the same time, i.e., there must be many altars. In the plan of the Monastery of S. Gall (see the adjacent plate) of about 820, which is drawn on cowhides sewn together, these altars are placed in the side aisles at right angles to the outer walls. The plan thus exhibits no particular care for the altars. They are accidental,

like a piece of furniture placed in the interior. These can be arranged just so in each parish church. It is not characteristic in the solution of the plan of a monastery church. The choir is not yet developed in accordance with the requirements.

The monastic community indeed at certain hours of the day and night must offer prayers and responsive hymns; the choir prayers, that in great part consist of the Psalms. Therefore the monastic brethren must there have seats together, which for responsive singing were best arranged in long and opposite rows. The S. Gall plan also affords no special places for this.

These two defects were discovered by later times and the plan was changed for these particular purposes. They especially attempted to arrange separate niches or chapels for the numerous altars. Since the very beginning of Christianity, the apse was the sacred place for the altar; what was more natural, than to arrange separate niches for the many side altars, either along the side walls or around the choir?

Thus Cluny, consecrated in 1131, exhibits a noble circle of chapels. The choir of the Abbey Church of Vezelay (Fig. 98), that dates from toward 1200, then has the fully developed circle of chapels. The nave originated about 1100 and with the vestibule (1132) most clearly exhibits the gradual transformation of French Romanesque art into the earliest Gothic. Viollet-le-Duc has illustrated and developed this in the most diverse places in his unsurpassed "Dictionnaire Raisonné de l'Architecture" etc. with his usual mastery.

66 57. Church at Trebitsch.

The Benedictine monasteries have in a remarkable manner been satisfied elsewhere with the usual basilican plan in reference to the altars, and they have placed the other necessary altars against the piers or at the walls of the side aisles. On the other hand, they created for the choir singing and rows of benches required therefor, long choirs. Such is shown by the Church at Trebitsch in Mähren (Figs. 99 - 101⁸⁸). No statements remain concerning the date of this church; but its forms indicate the time about 1200.

Note 88. After Heider, von Eitelberger & Hieser.

On the exterior, the choir in particular is completely developed with Romanesque details; on the contrary, there occurs the early Gothic in the interior. Moreover the entire church is covered by the quite peculiar vaults. Although these are apparently old, they represent the first attempts at star and net vaults. Since everything is plastered or whitewashed, certainty in this respect cannot be obtained.

The vaults of the nave seem to have so originated, that hexapartite cross vaults were foreseen. Yet in these hexapartite vaults the ribs corresponding to the main diagonals are also turned from the middle columns toward the main cross arches.

Furthermore, the crypt is of special interest besides its spaciousness, in that the centering of the cross vaults still remains in place. On its northern side appears a rich early Gothic doorway with a protecting vestibule. Likewise a gallery from the date of origin of the church has evidently remained in the western end.

58. Rood Loft.

Since a number of laymen with their wives and children belonged to the monastic family, the church must also stand open for them, as well as for the pilgrimages and travellers, who came to revere the saints, whose remains were usually deposited in the crypts of the monastery churches. Therefore the space for the monks was separated from the remainder of the church by high screens.

If the choir stalls, as at Trebitsch, stood within an enclosed choir, a termination was only necessary at the west. This occurred by means of the rood loft. This name (lettner) comes from "lectorium", since the evangelists and epistles were read from it. Therefore winding stairs usually led up to it at the rear. Before this rood loft and toward the nave was placed the altar for the divine worship of the laity.

Many similar rood lofts from the 12 th century still exist in Germany. Thus in Maulbrunn, Naumburg (eastern choir) etc.

From the 13 th date those in Wechselberg, in the western choir of the Cathedral at Naumburg, in Gelnhausen, in S. Elisabeth at Marburg; from the 14 th in the Foundation Church at Oberwesel on the Rhine; from the 15 th in the Cathedral at Magdeburg (1458), and from the 16 th in the Cathedral at Halberstadt (1510) etc.

II 59. Choir Enclosure.

If the choir stalls did not stand in a choir enclosed at the sides, but for example it extended to beneath the crossing or an aisle ran around the choir, then was it also protected by enclosing walls at the sides, the choir enclosure. These have been preserved much more frequently than the rood lofts, since the monastery churches were later transformed into parish churches. Then the rood loft must give way, since it obstructed the view of the high altar; the latter now found its place in the choir. Parish churches never possessed rood lofts.

Such choir enclosures of the Romanesque period are still found in S. Michael at Hildesheim, in Brauweiler, in the Cathedral at Merseburg, in the Cathedrals at Bamberg and Treves, in S. Matthias at Treves, etc.

These enclosures of the choir stalls have existed in all the centuries; they are then already shown by the ground plan of S. Gall of about 820. Numerous passages in the archives also support this. In S. Clemente at Rome, these well known enclosures have been preserved even from the time of Pope John VIII, thus from the 8th century; for they bear his signature; they are there lower than our northern ones.

b. Monastery Churches of the Cistercians and Premonstrants.

60. Cistercians.

When the Benedictine order began to age, a new order originated from its own monks; the Cistercians. S. Robert first founded in Molesme and then in Cisterz near Dijon in the year 1098 a new order of severer observance. The Cistercians also differ in clothing from the Benedictines, they go in white, while the Benedictines are clothed in black. After S. Bernard of Clairvaux (1112) is recorded the unexpected prosperity and the extension of this order, which within a half century had spread its monasteries over the entire West. Since these were located in remote valleys, in uninhabited forests and swamps, cleared and made them fertile, so that they bore culture and civilization, especially into the eastern portion of our country.

The Cistercians preferred the rectangular form for the choirs of their churches. Already Wilars de Honecourt drew in

his Sketch Book about 1240 such a church. (Fig. 102³⁴).

After Willis, R. Facsimile of the Sketch Book of Wilars de Honecourt. London. 1859.

For the required altars, special chapels were attached to the transepts, thereby properly fulfilling the programme of the monastery church, and indeed for an order not founded for the instruction of the people. For since the laity could not be present at the sacrifice of the mass of the different monks, then these chapels were not accessible from the transepts for the people. Thus in Maulbronn and in Hohenfurt (Fig. 103). The latter is located in southern Bohemia, and the church was begun in 1259.

These chapels usually extended around the choir likewise. Thus in Riddagshausen near Brunswick and in Arnsburg in the Wetterau (Figs. 104, 105³⁵). The latter monastery was founded in 1174, and its church was under construction until 1200; it exhibits the transition style of Burgundy.

Note 35. After Moller.

7/ The springings of the vaults are corbelled out, a procedure particularly favored by the Cistercians. It serves in form as a characteristic of their churches, cloisters and chapter houses. This method widened the passages and permitted the placing of wooden seats against the walls.

Of almost equal age to the Arnsburg Church is the Cistercian Church at Heiligenkreuz near Vienna (Figs. 106 - 109³⁶); it was commenced in 1187. Its vaults are also set on corbels. The side aisles in it are even narrower than in Arnsburg, thus being properly treated as monumental side passages. The airy choir only dates from the end of the 14th century, and it exhibits the very favorite hall form with rectangular ending of the choir. Likewise here, as on the Cathedrals at Magdeburg and Stendal and on the Sand Church at Breslau, the external axes are divided by a buttress and cross vaults of five compartments are employed.

Note 36. After Wiener Bauhütte etc.

While these churches exhibit the connected system, the slightly later one at Lilienfeld in lower Austria (Fig. 110) shows a cross vault in the clearstory above each vault of the side aisle. The church was begun in 1202. Only during the

72 construction was it transferred to the Cistercian order, and thus is explained the changed solution of the choir. The rectangular choir is enclosed by an ambulatory of two aisles, in which are placed the altars. The church was consecrated in 1220.

61. Premonstrants.

Almost contemporary with the appearance of S. Bernard of Clairvaux occurred the founding of the Premonstrants by S. Norbert. (1119). He was a canon at S. Victor in Xanten on the lower Rhine, and he founded a monastery in the forest of Premonstre near Coucy. Scientific improvement and pastoral care of the laity was the problem of the Premonstrants. Since S. Norbert was later Archbishop of Magdeburg, he settled his monks from thence (S. Marien at Magdeburg) in the Mark and in the adjacent countries (Diesdorf, Broda, Granzon, Ratzeburg, Jerichow, Havelberg, Brandenburg, Pölde, Belbog, Këlbick, Gottesgnaden, Leitzkow, Erbe, Quedlinburg and Moldenfurth). The Premonstrants did not exercise any particular influence upon the treatment of the ground plans of monastery churches.

c. Monastery Churches of the Franciscans and Dominicans.

62. Franciscans and Dominicans.

In the beginning of the 13 th century arose two other orders, those of the Franciscans and the Dominicans.

S. Francis of Assisi placed poverty as the chief vow, whence the popular name of begging friars. He died in 1226.

73 S. Dominic, a Spaniard, made the chief purposes of his order preaching and learned studies. He especially labored in southern France, and he died in 1221. His order also acquired a great extension.

Such a Dominican Church is S. Anastasia at Verona (Figs. 111 - 113), which was begun in 1290. As in many Cistercian churches, separate chapels are arranged at the transepts. Greater emphasis is laid in the nave upon good vision and spaciousness, since preaching was indeed a chief work of the Dominicans. The southern sky permitted for the clearstory the sparse lighting through the small upper lobed windows.

It is truly Italian, that all arches and vaults are held by visible tie-rods. We find the like in our cities on the sea-

seacoast. But the bad ground there made necessary this ugly expedient. Yet in Italy at this time, men were so little masters of construction, that as previously, they gave up the game as lost.

Moreover, the middle ages everywhere and very rightly and frequently employed anchors in the masonry itself. Wall anchors and sandstone cramps are necessary for every structure, even for those not especially very lightly built. For during the erection of different parts of the building, these are exposed to loads or stresses by scaffolds, materials, or by carelessness, which they do not afterwards have to resist or sustain. Anchors in the walls and in sandstone likewise fully protect it against any irregularities in the soil. But one must avoid placing the anchors too near the external surface, since they would otherwise be attacked by the penetrating dampness, then rust and by their swelling would burst the sandstone or brickwork.

Chapter 4. Foundation Churches.

63. Foundations.

A variety of monastery churches is formed by foundation churches. These were not used, like the monasteries, by a community of monkish clergy and lay brothers, but by a combination of secular clergy and laymen for a common life. Every place in such a "foundation" was furnished with the necessary support in natural products, some money and lodging, and it was a desirable arrangement for the neighboring sons and daughters of the lower nobility, just as the bishop's palace was for those of the higher nobles and of princes. Both foundations and palaces finally became the prey of that stratum of society, that ruined the church.

Besides the "prebends" for the clergy, there were such for youths, who desired to become clergymen and had to study further; likewise such for the architect, carpenter, baker, forster, etc., laymen who had taken no vows, and who could leave at any time. They were naturally called "our brothers", and thus originated some of the many monk architects, who all owe their existence, partly to faulty translations, partly to ignorance of mediaeval arrangements.

64. Churches.

The clergy, as well as the future clergymen of this foundation, also had to make the common prayers in the choir; therefore there must exist in their churches also the requisite choir space, sufficient to receive the rows of choir stalls. The remainder of the church was intended for the parish community, that belonged to the foundation. Such foundation churches existed in at least as great numbers as monastery churches.

65. Cathedral at Brunswick.

Such a foundation church was the Cathedral at Brunswick. (Fig. 114). The choir is very much elevated, with a spacious crypt beneath it. It occupies the square part of the choir and also the crossing and is still furnished with its side enclosures. This foundation church was founded by Henry the Lion in 1172 or 1178 after his return from the Holy Land. When Henry lay on his deathbed (1195), the church burned down. Thereafter it evidently first received the vaults of its aisles, that are all pointed, in contrast to the round arches of the choir vaults and the rest of the church. On this occasion were also

cut out the two trefoil windows beside the crossing. The greater part of the decoration now appearing in the entire interior of the church also dates only from that time. The name of the painter is found in the following inscription:-- "May this inform everyone that Johanneus Gallicus (Frenchman ?) painted this. God grant to him to dwell here. Brunswick. John. Wale." (Vale = farewell ?).

75 The church is externally of split stones with cut stone bands and mouldings. The split stone surfaces were plastered. Both side aisles were rebuilt later, the southern about 1350 and the northern about 1500. The group of towers exhibits, like the custom in Saxony, a colossal window in the belfry, which was indeed added about 1280.

The ground plan given in Fig. 114 attempts to again restore the buildings for the common life besides the church, and which no longer exist.

66. Foundation Church at Wimpfen-in-Thal.

The Foundation Church at Wimpfen-in-Thal (Fig. 115) exhibits a similar ground plan with a Gothic solution. Here the choir also extends beneath the crossing. Although this extension of the choir enclosure into the crossing was usual almost everywhere, it cannot avail as a solution. The interior of the church becomes quite obstructed and the transepts actually only serve for entrance or lumber rooms, since the divine service for the people occurs in the nave.

The remarkable deviation of the longitudinal axis must be explained by the location of the earlier church, whose western towers still remain. Such a break in the longitudinal axis is often found, even if not to such a degree as here. All kinds of explanations for it have been attempted. Thus men believed that the inclination of the choir from the longitudinal axis expressed the bending of the head of Christ on the cross. But such explanations, which were indeed very much favored in all countries, are entirely erroneous. The preachers have always needed, as today, to indulge in allegories and comparisons.

Already S. Isidore of Seville, in his "Origines" in the 6th century under the Gothic king Chintila, like S. Hraban about 880 in his "De Universi", stated for every article from roof

76 tiles and rafters down to the foundations, how men might compare it with our Christian morality or any passage of the Holy Scriptures. These comparisons are in great part deduced powerfully, as also today; and the structures are not formed thus and so on account of the comparison, but the comparisons arose on the basis of the peculiarities of existing buildings. The learned clergy are not the givers and the "honest stonemasons" the takers, but the reverse; the mediaeval architects are the givers and the wondering writers are the takers. And if one compares the absence of understanding in these writers, so common in the most childish tales, with the intellectual grasp and fulfilment of the "programme", that represents the crude actuality, then arises in a yet higher degree our astonishment at the intellectual superiority of those mediaeval architects.

Excavations during the last years have shown, that on the site of the existing Church in Wimpfen formerly stood a round church.

The church at Wimpfen-in-Thal is therefore still interesting, since in reference to its architect has been preserved the only existing statement, that he learned the art in France. Burchard de Hallis writes in his Chronicon, that his ancestor Burchard of Ditzensheim tore down the ruinous old church between 1261 and 1278 and had it rebuilt:-- "But he did not desist from what had been commenced, but told everything to the bishop and had visitors come, who should correctly examine everything. After these had diligently considered everything and knew it thoroughly, it was decided, that they must dismiss the concubines, even if this should be a hardship for the latter. Richard, who was himself a shining light of chastity, prevailed in this by his zeal, so that those who scorned to receive and obey this command were deprived of their prebends in disgrace. And after he had transferred to himself the income from the prebends of the absent, he tore down the minster built by the before mentioned honorable father Rudolf, that was crazy from its too great age, so that men believed it would fall down, and after he had brought there a Latomus, highly skilled in architecture, who came there directly from the city of Paris, located in France, he commanded the basilica to be constructed of cut stone after the French manner. But this artist erected the basilica, which

was most richly adorned internally and externally by statues of the saints, the windows and the columns likewise being sculptured with great pains and lavish expense, as they appear to human eyes unto this day. The people coming from all sides wondered at this excellent work, praised the artists, honored Richard, servant of God, enjoyed having seen him, and his name was borne afar, even by such that did not know him, more commonly called - - - .

But in the year of the Lord 1278 died this Dean Richard on the day of the holy evangelist S. Mark. ³⁷

Note 37. In Schammat. Vindemiae litterariae. II. p. 59. Fulda & Leipzig. 1723 - 1724.

Chapter 5. Cathedrals.

67. Characteristics.

The third and greatest problem for church architecture is presented by the bishop's church, termed cathedral or minster, although the last name is likewise applied to monastery or foundation churches.

The bishop needed assistants in the management of his diocese. These were the canons, the cathedral chapter. These canons were clergymen and thus, like the monastery churches, the cathedral also must afford a greater number of side altars. But since the laity could be present at the offering of the mass by the canons, these chapels must be accessible to the public. If they did not lie along the side aisles of the nave, but were arranged around the choir, then an ambulatory must be around the choir to conduct the public to them. This was the programme or requirement, which matured the form of the chevet end with a circlet of chapels.

Furthermore, these canons had to repeat the same responsive prayers in the choir, which were prescribed for the monks and the foundation clergy. Likewise for them were necessary long opposite rows of stalls -- the choir stalls -- and therefore elongated choirs. In order to prevent the public from entering this room, as well as to protect from chills and drafts, they were also enclosed by the choir screens along the sides and were terminated by the rood loft at the West, next the main aisle.

Since places were also required for the singers and the youthful clerics, these rows of stalls were often very extended, and they frequently extended under the crossing and even beyond it into the nave. On the contrary in Spain, the "choir", i.e. the enclosed choir stalls, is almost always not arranged in the choir but in the middle aisle, thus almost entirely obstructing the beautiful interior.

For the parish community, that belonged to the cathedral, a special altar was placed before the rood loft, and there the cathedral parish priest celebrated the offering of the mass; there also stood the pulpit. In brief, the longitudinal middle aisle of the cathedral chiefly served for parish use, and it was accordingly about 131 ft. long.

Since in great fortresses and for particular episcopal arrangements, the communities of all parishes in the city found places in the bishop's church, then was much space further necessary, and thus originated those colossal churches, that have chiefly attracted the attention of art lovers to themselves, and they accordingly pass for models of Christian, and especially of Gothic churches.

In the last half of the nineteenth century, their ground plans were imitated for modern Catholic parish churches, naturally in a dwarfed and very misunderstood manner. No attention whatever was paid to the needs of the community. The space behind the wide piers in the side aisles, in which one sees nothing of the altar and does not hear the sermon, are intended for the worshippers, just like those in the middle aisle. The favored and wealthy sit in the much superior places in the middle aisle, the poorer and younger members, whose attention is so much more endangered, occupy the less favorable places in the side aisles. Likewise the aisles have been extended to a quite unpermissible length. Thus men believed that they accurately imitated the middle ages, building according to the requirements, objecting to obtrude in the buildings forms, that followed the Renaissance further and did not arise from the requirements. To the Renaissance can be made the least objection in reference to the ground plan. This is generally adapted and suited to the needs in the most intellectual manner.

For many cathedrals, a separate parish church was built near the cathedral. The most beautiful and best known is indeed the *Liebfrauen Church* at Treves. Likewise the western choir of the cathedral and of the monastery church may well have served for parish purposes. In the Cathedral at Augsburg and in the Cathedral at Mentz, the western choir is still termed the parish choir.

68. Cathedral at Würzburg.

The Cathedral at Würzburg (Fig. 116) exhibits the cathedral scheme in the simplest form, such as would also be suitable for the ground plan of every monastery church. From the long rows of choir stalls is arranged a deep choir; on the other hand, no separate apses are provided for the greater number of side altars, in addition to those usual for the two prescribed side

altars. The fructifying germ of suitability has transformed this plan only in reference to the choir and its stalls; no new life appears for the monumental provision of the altars; it is there old and withered. Yet it originated only under Bishop Gottfried between 1184 and 1189; "he built anew the splendid temple of squared stones," says the Chronicle of Ebrach. It is indeed hard to determine, whether this statement relates to the entire cathedral or merely to the choir and transverse aisle.

69. cathedral at Magdeburg.

The Cathedral at Magdeburg (Figs. 117 to 119) shows new life on the contrary. Its architect has evidently been in France. He has seen the both masterly and monumental manner in which a separate apse was created for each altar, how these side apses were arranged in a circle about the chief apse, and how by means of an ambulatory around the latter, the side altars were made accessible to the worshippers and thus the dignified problem found magnificent expression in the most appropriate manner. Such a solution is worthy of a thoughtful man; it could only have sprung from the brains of highly cultured men, who had inscribed suitability on their standards, who were equipped with entire knowledge of their art and had the good fortune to live in the midst of a people, rich in men and means, that undertook such wonderful works, desired inspiration and could pay for them.

The old cathedral burned down in the spring of 1207; it was entirely removed during the summer, and a new structure was begun in 1208, which immediately comprised the entire cathedral. Only the southwest angle was not then undertaken, since its lower parts all belong only to the vanishing early Gothic. The architect, who began this cathedral, was trained in the same school, from which came the architects of the choir of Strasburg, the transverse aisles of Freiberg and of the Cathedral of Worms, of the choir square at Treves Cathedral, etc. He was followed in the upper story -- the choir possesses a gallery -- by an architect, who designed the early Gothic in the style of the Cistercian monasteries of that time. In fact, the details also of this so-called bishop's passage of Magdeburg Cathedral, are entirely similar to those of Walkenried,

Maulbronn and Ebrach; furthermore he liked a particular form of corbel, on which he always carved two half moons, which has thus become a mark of recognition of him in these four buildings.

This architect completed the choir. The building then went ^{8/} on very slowly; early Gothic chapels may be seen at the south-west angle, which correspond to the beginning of the Church of S. Elisabeth in Marburg. Only about 1274 was the construction energetically undertaken again. From that year has been preserved a document of Archbishop Conrad, wherein he describes the condition of the structure as follows:--⁸⁸ "Furthermore the noble structure, the rebuilding of our minster, which was commenced in a most praiseworthy manner, has become an abomination for the lack of money, without which nothing can proceed. It complains that its walls cannot extend further; it laments, that its bases have likewise scarcely received their foundations, also that the piers are built and the capitals are set thereon; that the vaults may be constructed later, as necessity requires, so that heretofore no thought at all could be devoted to the roof for completing the work. It appears to complain of the delay and loss of time, when it frequently exhibits the completed pavement as wet and its walls dripping with the entering rain. It is necessary to remedy this fault, as before stated."

Note 38. From Allg. Archiv. für Gesch. d. Preuss. Staat. V. p. 187. 1831.

In fact, the clearstory and upper parts of the side aisles exhibit the forms of the vanishing early Gothic. The new architect omitted the galleries in the nave and covered the side aisles with great five-parted cross vaults. Whether these were foreseen from the beginning, or much rather that two vaults in the side aisles should occur for one bay of the clearstory, and whether another column was intended between the piers of the middle aisle, cannot be decided without excavations. Great hexapartite cross vaults were foreseen in the clearstory. The completing architect executed two rectangular cross vaults in the place of each of them. Plain buttresses without flying buttresses support these vaults. The windows extend down to the vaults of the side aisles, without being restricted by a triforium, thereby producing an abundance of light in the interior--an entirely individual and not a French arrangement.

The roofs of the side aisles are hipped at their rear ends, so that they are entirely invisible from the interior. In the southwest tower, this architect endeavored to entirely surpass the tower of the first architect; only the details betray his high Gothic hand. Only in 1363 occurred the consecration with great pomp, according to tradition so late, because means for it were wanting. Then every century until the Reformation added something to the western facade. Since the Magdeburg Cathedral further possesses rich ornamental and statuary decoration from 1208 onward till the later period of the Renaissance, and it has even preserved remains of the sculptured ornamentation of the old cathedral, thus it is one of the monuments of mediaeval architecture in north Germany best worth seeing. -- The Cathedral had already lost the two cross flowers from its western towers before Tilly, as shown by medals of the Administrator Christian Wilhelm of 1614 and 1622.

70. Cathedral at Cologne.

In the Cathedral at Cologne (Fig. 120), we behold the grandest and most matured example of the ground plan of the mediaeval cathedral. It likewise originated from the French training; it indeed entirely imitates the two choirs of Amiens and of Beauvais; but it excels both in regular development. The most perfect flower of Gothic sprung from German soil. Furthermore, it surpasses both by its 5-aisled nave. If the latter only was constructed during the best Gothic period, it certainly belonged to the first design. Five-aisled churches were not uncommon in France about this time (1248). Notre Dame at Paris and the Cathedral at Bourges had 5-aisled naves, the former was already completed, and the latter was under construction. There likewise stood in Troyes two 5-aisled churches with transepts. The Parish Church S. Madeleine was already completed in the early Gothic period. The Cathedral was finished in the nave up to the lower capitals. Also in Beaumont on the Oise was an early Gothic 5-aisled church. The architect of Cologne cathedral evidently sought to completely surpass everything then existing. Thus he foresaw the 5-aisled nave, since he constructed the choir in five aisles.

Concerning the glorious creator of this colossal work, for which Archbishop Conrad of Hochstaden laid the corner stone on

Aug. 15, 1248, we have good information. In the necrology of the Abbey S. Pantaleon at Cologne is the following under date of April 24 of the same year:--

"There died Master Gerard, who had commenced the rebuilding of the cathedral. The same, with his wife and children, bequeathed to our monastery for the good of their souls the half of three houses, which are located in S. Marzellen St., as more fully described in the shrine book."

Note 39. See Merlo, J.J. Kölnische Künstler in alter und neuerer Zeit. Published by E. Firmensch - Richartz & H. Keussen. p. 282. Düsseldorf. 1895.

And under December 13 is noted:-- "Gada, wife of the afore-said Master Gerard."

It is further made known by the cathedral chapter in 1257, that in gratitude to Gerard for the service rendered, it had transferred to him a site for a house, larger than usual:-- "Be it known to all, both present and future, that the Cologne chapter has transferred to Master Gerard, stonemason, superintendent of the construction of this church, of its former vineyard located near S. Marzellus, which is in its free possession, a larger and wider piece of ground than the others, as it lies there and contains the great stone house, built by Master Gerard at his own costs - - - ."

That he was named Gerard von Riehle, as Fanne prefers in the work mentioned below, ⁴⁰ has become very doubtful, and which Firmenich-Richartz has shown that the documents mentioned do not relate to the cathedral architect Gerard, that where he is mentioned as cathedral architect, the addition of "von Riehle" never occurs, and that only a document of the year 1247 treats of a Gerard von Riehle, by which it cannot be proved that he was the cathedral architect, but was a stonecutter. --- Now return to the building of the cathedral.

Note 40. Fanne, A. Diplomatische Beiträge zur Geschichte der Baumeister des Kölner Doms etc. Cologne. 1843.

While the cathedral was evidently constructed very rapidly as far as to the principal cornice of the capitals, so that the hand of the same architect was busied so far, the high choir with its buttresses belongs to another hand. The entire choir end was commenced in 1328.

Each century then continued the work of building. The side aisles were first carried up; then the colossal towers of the west facade were commenced. The southern tower was built highest, as far as the church roof. Thus it was left until in the 19th century with the famous cathedral derrick above it. The western towers were built according to the still existing design, which may be seen suspended in one of the chapels, retaining the same forms of details, shown by the lower portions of the towers. Only the transepts were newly designed by the skilful hand of the second cathedral architect Zwirnow.

By this artist, as if created for his work, was also produced the design for the Gürzenich Hall in Cologne, which also shows him as a divinely gifted artist on that side. One of his pupils was Friedrich von Schmidt, the cathedral architect of S. Stephen and the architect of the City Hall of Vienna.

Further information concerning the superstructure of Cologne Cathedral will be given in Chapter 5 (in the description of the development of the cross section). A reduced reproduction of the original design for the western facade follows in Chapter 7 (Mediaeval Architectural Drawings).

71. S. Sernin at Toulouse.

S. Sernin (S. Saturnin; Fig. 121) at Toulouse already exhibits five aisles. This cathedral church was likewise completed before Cologne Cathedral, even if the consecration of this building in 1096 by Pope Urban V should appear much too early. In an extreme case, the choir and transverse aisle were finished about that time. The nave dates from about 1150. The choir shows very plainly the gradual origin of the chevet chapels. Between each two chapels yet remains a window of the ambulatory.

S. Sernin is a brick church. The towers of its western facade show by a middle division, that two side aisles lie behind each. If all details of a 5-aisled plan had already existed for a century, why might not this in Cologne belong to the original plan of 1248 and merely date from the 14th century?

72. Cathedral at Prague.

The Cathedral at Prague (Figs. 122 to 124)⁴¹ was begun by Charles IV in the year 1344. Its architect was Matthias of Arras, whom Charles had brought from Avignon, according to the inscription above the bust of Matthias. For in the triforium of the

choir are placed busts of the emperor Charles, of his wives and children, also of the archbishop at the date of the building, as well as of the superintendent of construction and of the two architects, Matthias of Arras and Peter Parler. This likewise proves the high estimation of the architect and also the understanding of art at that time. Who would honor his architect to-day in that manner? And yet men will affirm that such highly esteemed artists in that time were merely insignificant master artisans. All these unsettled opinions are based on ignorance of that period.

The design of Prague Cathedral exhibits no peculiarities. It is 5-aisled with one transverse aisle, like Cologne, and it should receive two towers at the western end. The original design entirely resembles that of the Cathedral of Narbonne.

Under the second architect, Peter Parler from Gmünd in Swabia, who after 1356 supervised the building of the cathedral, all sorts of changes in the plan were made. Beside the southern transept is inserted on the east the great chapel of S. Wenzel, and west of it was built a great tower. Peter already designed in the most florid late Gothic. The choir was commenced in 1386.

The upper portion of the choir is almost entirely of glass; there are no walls, and even the clustered columns beneath the heavy vaults are so restricted and open, that they have not endured well. Modern warehouses, which are much esteemed and are so surprising as such a great advance in omitting the wall masses and in the use of colossal surfaces of glass, are not really different from the glass surfaces of the Gothic cathedral. The Gothic architects have there solved their problem in the most completely artistic manner, which cannot yet be said for our contemporaries.

If one considers the buttresses of Prague Cathedral, it is apparent that the lower flying buttress rests at the springing of the vaults. Thus also at the Church in Kolin. The upper flying buttress serves to stiffen the clearstory wall against the wind pressure on the roof. But since the lowest flying buttress plainly rests too low with its impost at the springing of the vaults, then must the upper one also resist the thrust of the vaults. The part of the wall between the two flying buttresses serves as a stiff post, against which rests the vault. If one

remembers, that these vaults cover the cathedral at the height where with us the spires of the towers commence; (that Cologne Cathedral measures 137.8 ft. high to the main cornice of the middle aisle); that these vaults exhibit spans (45.9 to 52.5 ft.), which our parish churches rarely or never equal; that our small vaults at a moderate height rest against massive buttresses and do not have to be carried to fixed points only by the wise buttress systems; if one then considers what engineers and officials would be required today for calculating, approving and constructing this anxious little architectural structure -- what esteem, what unlimited reverence must we pay to the gigantic intellects of the architects of those times, who without many predecessors or models designed such wonderful structures, and brought them to completion through centuries!. And what treatment should be accorded to those, that see in them honest master artisans!

With the death of Charles IV and the outbreak of the Hussite disquiet, the construction of the cathedral stopped until in the last decades of the 19th century, it was completed under the charge of Mocker, so far as relates to what was permitted at the west by the previously erected wing of the castle.

73. Church at Kolin.

From an inscription, Peter Parler was the son of one Master Heinrich of Gmünd in Swabia. In the same inscription, he is also named as architect of the Parish Church of Kolin (Figs. 125, 126). This church shows him on a much higher and more favorable side. He created an entirely new elevation of the chevet chapels, for he did not permit the separate chapels to appear externally. A uniform wall was only divided by vertical projections of triangular section and enclosed all chapels and buttresses. The view of this substructure far excels that of other chevets. We likewise find this decided innovation on S. Barbara at Kuttenberg; one may therefore assume that Peter Parler also designed that, particularly since the mouldings on the base and at the windows are almost exactly repeated, and furthermore family relations of Peter in Kuttenberg may be proved.

These chapels further show a comprehension, which we find customary on the Baltic coasts, certainly without the external unifying enclosure. The capitals are designed so shallow, that

the ambulatory extends through the chapels or is cut off from the chapels. No transverse arch separates the chapel vault from that of the ambulatory. Thus the Monastery Church at Doberan already exhibits this, and with dates from the early Gothic, and the Cathedral in Schwerin, entirely similar in the ground plan.

Note 42. From Mitt. d. Central-Commission etc.

S. Bartholomäus in Kolin is a parish church. When on such a one is arranged an ambulatory with chevet chapels, it might at first be regarded as a solution not in accordance with the programme. But still this solution entirely corresponds to the requirements for certain parish churches. There were usually in a parish all sorts of societies and brotherhoods. If wealthy, each one might endow an altar for its patron saint as a visible token of its relationship. Such altars were usually built, more than was proper. Therefore the rule existed, that without the bishop's permission, no parish priest should permit the erection of more than the prescribed number of altars. If one foresees in the design the places for such altars, then naturally the monumental expression for them is the apse, the chapel. If such chapels are not provided between the buttresses of the nave, there remains only the chevet chapels with an ambulatory around the high altar. Men also sought thereby to equal the bishop's church. That the Kolin citizens had much money and might entertain this ambition is shown by this construction of the choir, to which the emperor may have contributed, since Kolin was a royal city. By the limitation of the chapels to one-half their usual area is taken into account the subordination of the parish church. The nave of the church is moreover an early Gothic hall church, whose buttresses are perforated externally by passages, like those of Regensburg Cathedral.

89 74. Cathedrals at Doberan and Schwerin.

Doberan and Schwerin are older. Doberan was already erected after a burning of the earlier church in the year 1291. The consecration indeed only occurred in 1368. Yet the building of the nave extended until then.

The Cathedral at Schwerin (Fig. 127) had completed its clear-story vaults in 1430, thus being certainly begun in the 14 th

century.

75. Church at Schwaz.

It is of special interest to observe how men enlarged existing churches in the middle ages or so built them over the older one, that a portion of the old church might be used until the completion of the rebuilding.

The Parish Church at Schwaz in the Tyrol (Fig. 128) is most instructive in this respect. It now appears with four aisles. On more careful examination it is found, that it was formerly a 3-aisled hall church, whose southern aisle was torn down, and a second middle aisle with a new side aisle was built in its place. The high altar still stands in the original middle apse; the tower likewise belongs to the original structure. On account of the latter and also of the street, the church could not be extended to the north nor to the west by reason of the church square. The sole possibility was toward the south. In fact it is only necessary to examine the southern window piers of the old choir in order to see, that the two southern aisles were added to an existing church. The forms of details also prove this, for those of the southern aisles are from 50 to 100 years later than those of the northern aisles.

90 76. Enlargement of Churches.

This method of enlargement made it possible, that the two required southern walls could be first built outside the church, without disturbing the interior in any manner. Then only was it necessary to separate the southern side aisle by a wooden partition, and the removal of the old vault and of the walls might then be commenced.

Another way of beautifying the existing church and of further using it during the rebuilding consisted in the erection of a new choir design with transverse aisle outside the eastern end, to which the old nave was extended, after the old choir was removed. This is exhibited by Great S. Martin and S. Aposteln at Cologne, S. Quirin at Neuss and S. Nazaire at Carcassone.

Or the new structure was constructed about the old building, when all external walls were first erected outside the existing church, the clearstory piers being later placed in the old side aisles. Thus the middle aisle could be utilized until the end of the rebuilding. As shown by excavations, this procedure oc-

occurred at the Cathedral at Naumburg.

Thereby single-aisled churches have been transformed into 3-aisled, retaining the older aisle as a side aisle and constructing a new middle aisle with a second side aisle. Thus in S. Marian zur Höhe at Soest and in Krahnenburg on the lower Rhine. Lastly, the walls of the side aisles were simply moved outwards; this is exhibited by the Cathedral at Brunswick.

Chapter 6. Development of the different Parts of the Church Building.

a. Altar Space or Choir.

Side Apses, Ambulatory and Chevet Chapels.

77. Altar Apse.

As we have considered in the preceding the development of the ground plan of the mediaeval church as an entirety, we must now take up the development of the separate parts. There is first the altar apse.

In the Romanesque period it was almost always circular in both interior and exterior. The little Church at Faurndau near Göppingen (Fig. 129) gives in its ground plan a clear representation of this. The date of its origin is not settled; yet its forms originated at the end of the 12th century. The bases exhibit corner leaves, the choir square and galleries show vaults with ribs.

The Cathedral at Fünfkirchen in Hungary presents in its exterior (Fig. 130⁴³) a characteristic representation of this plain but very effective architecture. Its date of construction is likewise not fixed.

Note 43. After Mitt. d. Central-Kommission etc.

For greater ornamentation, small columns with round arches were added to the altar apse externally. The wall thereby became thicker above, so that the roof and the gutter found a better support. Thus in Gurk (Fig. 131).

For lofty choirs, two series of such columns were arranged above each other. This is already shown by the eastern apse in Laach, which was already complete in 1112. Here are also added two side towers to the choir apse in order to emphasize its importance; these latter must indeed only have been finished about 1156.

As previously stated, there had already been formed at an early date the custom of arranging double choirs at east and west for monastery and cathedral churches. The latter probably was utilized for parish divine services. No difference appears in the treatment. Thus Laach (Figs. 132 and 134⁴⁴) already exhibits two quite similarly treated choirs. The two-story construction of the western choir is due to the galleries arranged there.

Note 44. After Geyer & Götz.

The steepness of the roofs apparent on the apses at Gurk is certainly not original. Romanesque roofs are almost all inclined at much less than a right angle.

78. Dwarf Galleries.

About the year 1150 dwarf galleries appear in Germany on these choirs. Where they originated or where they are first found is difficult to determine. One might believe that Italy was also their inventor, that country which loved and employed these dwarf galleries to such an exceeding extent. But such cannot be proved there before 1150. These occur with particular effectiveness on the Rhine, and they are mostly accompanied by a series of rectangular panels, which are chiefly inlaid with slabs of slate. Thus we see them on the choirs of Schwarzhof (consecrated in 1151), of Great S. Martin (consecrated in 1171), of S. Aposteln (consecrated in 1199) and of S. Gereon (consecrated in 1218).

It cannot be determined when the choir of Andernach (Fig. 134⁴⁵) originated; yet it added its forms like the preceding at the same time and later. The earlier building is still preserved in the existing Andernach Parish Church. This may be plainly seen externally on the side aisles. These have been plainly treated externally and have smooth outer walls with small round-arched windows above each other, since a gallery exists in the interior. These walls exhibit the beginning of a very rich facing in the forms of the choir apse, that suddenly ceases after a few yards. The northeast tower likewise exhibits the simple and ancient form.

Note 45. After Bock, F. Rheinlands Denkmale des Mittelalters. Cologne & Neuss. 1869.

It was here as everywhere else. The old church was utilized as it was possible to do. Only the clearstory walls appear both internally and externally to have been rebuilt. In the choir square, that must have received its vaulting at the same time as the external architecture, there likewise appear ribs beneath the vaults. The period of the highest development of German Romanesque churches was already acquainted with French attainments.

While in Andernach as in Cologne, the gable of the nave is

chiefly ornamented above by blind niches, the Cathedral at Spire exhibits the richest procedure; for there in particular, the gable is also resolved into an inclined dwarf gallery. These portions of the construction in Spire date from the building, which was perhaps executed after the great fire of 1159. This highest development of Romanesque ornamentation also coincides here in Spire with the knowledge of French rib vaulting as well as the French resumption of antique ornament (about 1140).

79. Resumption of Antique Ornament.

The columns in the interior of the transverse aisle exhibit Corinthian and Composite capitals of the greatest perfection. Less beautiful capitals, even though richer, are to be found in the chapel of Emmeran on its southern side, which is contemporary with the nave. Somewhat later is the chapel of S. Afra on the northern side, whose capitals likewise imitate the antique, but in the charming manner common in Germany about 1200 at the introduction of the Burgundian early Gothic. Similar antique capitals were drawn by the architect of the Magdeburg bishop's passage, the same that designed Walkenried, Forach (S. Michael's chapel), Maulbronn (refectory and the cloister next the church).

80. Tower over the High Altar.

Consider further the development of the choir. The architect of S. Johann near Bozen (Figs. 135, 136⁴⁶) placed the tower over the high altar. This is a procedure, that was very natural and certainly had already been attempted by many. But the habit of seeing the tower at the western end of the church was so strong, while the apse was involuntarily supposed to be at the opposite end, that the church thereby produced a reversed impression. It would otherwise certainly be natural to place the chief part of the exterior of the church where was the most distinguished locality in the interior.

Note 46. From Wiener Bauhütte etc.

This tower is rectangular in plan, an economical procedure. For such a tower is naturally cheaper than one with a square plan, making a right stately impression. The bells must then swing parallel to the longer side, since the tower would otherwise be put in vibration.

81. Polygonal Choirs.

In late Romanesque churches, the apse is externally polygonal, mostly made hexagonal like the apses of the eastern churches, since the window arches and sills cause great difficulties by curvature. Thus S. Severin in Cologne and the eastern choir of the Cathedral in Bamberg.

As already stated, the latter originated about 1200. The north tower represented here (see the adjacent plate) exhibits a suggestion of Essenwein, for the actual original appearance of the tower. Both are now of the form shown by the eastern one. In 1766, the western spires were rebuilt and the eastern in 1767.

A further advance is shown by the main apse of Trebitsch (Figs. 137, 138 ⁴⁷). This already has buttresses, while the side apses are still the old circular structures. The architect has connected these buttresses above by round arches and thereby created a place for an internal passage. In the interior may also be seen in the details an entire acquaintance with early Gothic, indeed even with its entire system of construction.

Note 47. From Heider, von Eitelberger & Hieser.

A very charming treatment of the choir is exhibited by the choir of Vetheuil (Figs. 139, 140 ⁴⁸). The series of closely set very narrow windows with their deep splays in the interior has an excellent effect. On the exterior and already at the base of the high windows is a passage, that penetrates through the buttress; this is of special value for the maintenance of the structure. The buttresses show the original form with numerous offsets, as they also occur on the towers of Notre Dame at Chalons-sur-Marne.

Note 48. From Archives de la Commission etc.

The round choir end was longest retained in France, even in the developed early Gothic. With the introduction of Gothic, the apse also became polygonal internally. It exhibits all possible polygons; the half hexagon, the half decagon, five sides of an octagon, seven sides of a dodecagon, it was even extended to show seven sides of a decagon etc. Thus for example, the Market Church at Hanover (Fig. 141 ⁴⁹).

Note 49. From Mithoff, H. W. A. Archiv für Niedersachsens Kunstgeschichte etc. Hanover. 1852 - 1859.

98 While one side of the polygon almost always lies on the lon-
99

longitudinal axis, a number of churches show a pier in the middle. Thus the western choir of Naumburg Cathedral (already about 1270), further the Tein Church (Fig. 142) and the Karlshofer Church in Prague, the Parish Church at Kolin and S. Barbara at Kuttendorf. As previously stated, the two latter are designs of the cathedral architect of Charles IV, Peter Parler of Gmünd.

82. Chapels on the Transverse Aisle.

If the chapels were arranged on the transverse aisle and beside the main apse, there result forms of two kinds. They either compose a group of three or five with the apse, whose chief outlines are inscribed within a triangle, or the chapels lie beside the principal apse, uniformly arranged. An example of the first arrangement is presented by the ground plan of the Parish Church of Gelnhausen (Fig. 143⁵⁰). As a sprout of the transition style, this church yet exhibits both forms of round apses without buttresses and of polygonal ones with them. They date from the time about 1200; the nave has even yet retained a wooden ceiling. Likewise the old rood loft of that period (about 1200 - 1220) has saved itself. Over the two side apses have been erected two towers to accompany the tower over the crossing.

Note 50. After Moller.

Königsutter (fig. 144) is considerably older, probably originating under the emperor Lothair von Supplingenburg, who introduced Benedictines there instead of a convent of nuns and was later buried in the church.(1137).

The plan of the choir is composed of five apses and it was vaulted from the beginning. Only the vaults of the nave alone date from a later time, really from the 17th century. Particularly interesting is the two-aisled portion of the cloister beside the church, vaulted above a row of richly decorated columns, which indeed also served as the chapter hall.

Outside the choir, the sculptor has allowed himself a joke on posterity. He cut the following inscription, which is to be read backward.

"CS X MURIM ENIMALEC OIRAV MUIMIXE SUPO COH." (Hoc opus vario celamine mirum x C.S.). He has suppressed his name.

100 83. Chapels on the Transepts.

By the Cistersians, the chapels were uniformly arranged on the transepts. This is already shown by the Romanesque Church at Thoronet (Fig. 145), which was founded between 1146 and 1148.

The most stately and charming development of these chapels is presented by S. Nazaire at Carcassonne (Figs. 146, 147 ⁵¹, ⁵²). The walls between the separate chapels are entirely opened, so that only in the lower part and between the altars remains a solid division wall. Moreover, since these chapels extend as high as the transverse aisle, there is no more imposing transverse aisle than this. It originated in 1320 - 1330, and after those with the chevet chapels about the choir, it is one of the most spirited and masterly designs.

Note 51. From Viollet le Duc.

Note 52. From Archives de la Commission etc.

84. Enlarged Choir.

As previously mentioned, if the choir not only serves as the altar apse, but if the long rows of choir stalls for the monks, foundation clergy or canons must be placed therein, then must the choir be lengthened by two, three or more bays. Thus may it be seen in S. Maria at Gracow (Fig. 149) and at the Cathedral in Königsberg (Fig. 148). The latter, besides this extension, also exhibits the peculiarity of a choir with rectangular ending; its corner stone was laid in 1333. The rectangular choirs, such as are shown at Limberg-on-H (1080' see Figs. 1,2), have been known in Germany from the earliest period, and they have been preferred in many regions.

The greatest rectangular ending is shown by the Cistercian Church Heiligenkreuz near Vienna (Fig. 150 ⁵³). This choir was begun after 1290 and consecrated in 1295. It forms a great hall, so airy as one can conceive, that owes its existence to the same reason as the halls of the parish churches. In both were a great number of men gathered together; for the parish church in the nave, with the monastic brotherhood here in the choir.

Note 53. From Heider, Eitelberger & Hieser.

Their successor is the Church of the Foundation Neuberg, that is not merely the choir, but treats the nave also as a single hall -- a truer and freer thought of the master.

102 85. Choirs without Buttresses.

In the Romanesque period, the German churches had no buttresses;

the Gothic first caused their adoption. Therefore although nearly all Romanesque choirs are vaulted, chiefly by a half dome, they have no buttresses. The choir vaults are so small, that in most cases they are sufficiently supported without buttresses; yet the Romanesque apse has generally been loosened by the thrust of the vault. Therefore even Gothic polygonal choirs are also found to be built without buttresses. Thus are the three choirs of S. Peter in Soest from the early Gothic period.

The Church of the Carthusians at Caming (Fig. 151 ⁵⁴) exhibits the scheme of a middle Gothic choir ending, such as may be seen by hundreds in Germany. Over the side choirs are here arranged upper stories as a peculiarity; yet the three aisles end with the here visible western wall, built directly against the choirs, and which supports the stone roof tower by skilful corbelling, only the middle aisle being further extended as a single aisled structure -- a very peculiar plan.

Note 54. After Wiener Bauhütte, etc.

86. Small Colonnade Ambulatories in Choirs.

The late Romanesque period sought to provide against the thrust of vaults by arranging free internal columns before the wall, as in Great S. Martin (1171) and S. Aposteln (1199) at Cologne. Thereby are produced narrow passages around the choir at the height of the windows, which are covered by a small tunnel vault extending in a circle.

This expedient was utilized by those architects in the early Gothic time (after 1208) and after the desolating wars of Philip of Swabia and of Otto of Brunswick, who vaulted and made fire-proof the burned Romanesque churches, which had previously had only wooden ceilings. They left the external walls untouched -- the buttresses added later rudely intersected the Romanesque architecture -- and they set small columns inside at the width of a narrow passage from the wall. Thus in S. Cunibert at Cologne are two rows above each other, or in Sinzig, where a thick wall is laid before the lower ones and the colonnade ambulatory only appears in the upper part of the choir and in the transepts.

Note 55. From Adler.

87. Choir Ambulatories and Chevets.

While in Germany during the Romanesque period, the side aisles almost always ended at the transepts, or if they did not exist, since the middle aisle was closed by an apse, it was preferred to extend the side aisles around the principal choir as a dignified ambulatory, especially in France. In Germany during the Romanesque period, indeed only S. Godehard at Hildesheim (completed about 1146) was furnished with a choir ambulatory. One also certainly sees there immediately the high charm of this arrangement. Anything more stately and solemn can scarcely be conceived, than this high altar surrounded by a semicircle of splendid columns.

Men were so charmed by these ambulatories in France, that nearly every church of importance shows them. Where two side aisles exist, as in Notre Dame at Paris, both were carried around the choir as a doubled ambulatory. Attached to this ambulatory were the chevet chapels, and there originated the Gothic cathedral chevet choir.

If these churches had galleries, like the Cathedrals of Noyon and of Paris, these galleries were extended around the choir. This is also shown by the Cathedral in Magdeburg (see Fig. 159).

The most impressive development of such an ambulatory is however presented by the German hall churches of the later time, when these high side aisles likewise extended around the choir. Thereby is produced one of the grandest views for those observing the choir from the middle aisle. An especially prominent example here is the Church of S. Catherine in Brandenburg, a parish church (see Figs. 31, 33).

An especially prominent example here is the Church S. Catherine in Brandenburg, a parish church (see Figs. 31 - 33).

How this form of the choir for hall churches appears externally, if the hall is carried as an assembly room around the choir, is shown by the Church Maria at Stendal (Fig. 152). The whole is furnished with a stately battlement parapet and indeed dates from 1447.

In fact these ambulatories are excellently adapted to parish churches. In the Gothic churches with many high windows, the cold light from all sides falls down on the clergy at the altar. If a hall aisle extends around the choir, the windows are then set so far distant, that their cold light does not reach the al-

altar. The basilican ambulatory does not produce this advantage. Moreover since on different occasions, the laity are collected around the altar, such an ambulatory fulfils two needs in a monumental way. This arrangement is also unsurpassed in artistic respects.

In the beginning, the ambulatories presented great difficulties in their vaulting, and one may assert, that the ribbed vaults of the Gothic were produced by the struggle of French architects with the difficulties of the ambulatories.

In S. Godehard at Hildesheim (Fig. 153), this ambulatory is covered by a tunnel (annular) vault, and thus special difficulties did not occur. The cross vaults in the straight portion of the ambulatory are plainly of later origin. The corner stone was laid in 1133; the consecration occurred in 1146.

Similar is the plan of the little French Church at Vignory in Champagne (Fig. 154 ⁵⁶), which must have already originated in the 11th century. The details are certainly entirely different from those in S. Godehard, since they are about 100 years earlier, so long ago were the choir ambulatories known already in France.

Note 56. From Archives de la Commission etc.

Since the Hildesheim bishop advocated and obtained the canonization of his predecessor Godehard at the Council of Rheims, (1131), it might be that he sent his architect there later, in order to study the novelties of the French. That the architect himself was not French is shown by the pure German and Saxon peculiar art as well as by the entire system of the church, which is in good Hildesheim style. Likewise he excels completely his possible predecessor in artistic respects.

Entirely the same arrangement of the aisle is shown by S. Philibert at Tournus, except that the chapels are rectangular (Fig. 155); yet the date of origin of this choir structure is not determined.

How such a choir is shaped externally is exhibited by the Church of Notre Dame at Beaune (Fig. 156 ⁵⁶). The pointed windows and the upper part of the choir are later additions. It is approximately of the same age as S. Godehard at Hildesheim, and it has a clearstory covered by a pointed tunnel vault. The elevation of this choir can make no claim to beauty; the problem

was but commenced.

The Magdeburg Cathedral (Figs. 157 - 159) then exhibits the complete chevet chapels, as such were meanwhile further developed in France. While the exterior is not overpowering, the interior has the highest perfection. When the sunlight falls through the chapel windows upon the beautiful clustered columns and their capitals with richly interlaced and varied ornaments, one can scarcely conceive anything more beautiful.

The two stories owe their origin to the hands of two entirely different architects. The original architect, who designed the lower story, designed in that "transition", style, such as is shown by the choir square of the Cathedral at Treves, the transverse aisle of the Cathedral at Freiberg and similar works. The architect of the upper story was already acquainted with the buttresses, the ribs, and the volute capitals with bells; in brief, he designed in the French style of the Cistercian monasteries, which originated in Burgundy. Particularly is the lower member of the main cornice a special peculiarity of Burgundy. It was further the same architect, who designed the Monastery Churches of Walkenried and Ebrach, as at Maulbronn the monks' refectory, the vestibule and a portion of the cloister. He had two half moons as a particular mark, which he placed on a certain kind of corbels.

The Magdeburg choir shows a half decagon. In order to not permit the ribs of the high choir to intersect against the cross arch, the keystone is irregularly transferred from the centre of the decagon. With five sides of an octagon, as in Zwettl, this difficulty is avoided. (Fig. 160).

If the vault of a clearstory be resolved into a star or net vault, the half decagon also presents no further difficulties. This is so shown by S. Barbara at Kutenberg (Figs. 162, 163⁵⁷). Since silver mining there afforded such excellent profits, that miners hastened there from all sides, the latter commenced not merely a 5-aisled church to accommodate the multitude of believers, but they further supplied it with galleries. Located on a steeply inclined ridge above the city, it presents with its forest of flying buttresses and pinnacles above the enclosed colossal substructure of the chapels one of the grandest views, that the human imagination has ever conceived. The design and

the beginning of the structure were most probably by Peter Parler, as already stated, since this choir is almost entirely similar to that in Kolin.

Note 57. From Mitt. d. Central Commission etc.

199
112 The choir of the Franciscan Church in Salzburg (Fig. 161⁵⁸) exhibits the most airy hall, that may be imagined. The ambulatory is effected by only a single column. These five columns in the choir stand so far apart, and the entire omission of all cross arches, even between the different aisles, make the vaults of the whole of the hall choir into an unity, so that one no longer notices the connection of the apparently irregularly placed columns; one receives a more or less unquiet and uneasy impression. Certainly if a great multitude of men are to be massed around a preacher, there is no better arrangement for seeing, unless even these columns be omitted and the vaults are thrown directly from one abutment to another. The choir originated about 1500.

Note 58. From Mitt d. Central Commission.

88. Designing the Main Choir.

The designing of the fully developed choir with the chevet chapels presents its difficulties.

Let us first consider that of Prague Cathedral. (Fig. 164⁵⁹). There is a difficulty to be overcome without hesitation, for the keystone of the upper choir vault X is located in the transverse arch. Thereby like chapels are obtained in the polygon and an unbroken extension of the radii X to B, E' and G'. In general this intersection of the ribs with the cross arch has been avoided, and therefore five sides of an octagon or seven of a dodecagon were preferred. It is then possible to separate the keystone from the cross arch; yet the radii from X to B, E' and G' must then be broken in order to make possible a regular division of the chapels. (See plan of Cologne Cathedral in Chapter 5; Cathedral Churches? Fig. 120). The Prague solution also has the disadvantage, that if one desires to retain the width of the chapels of the polygon along the nave, then is obtained in the placing of the arches an opening entirely different from the arches C E, E G etc. Or as occurred in Prague, one must make the chapels much narrower along the nave. At Cologne Cathedral is inserted an arch forming a mean

between both widths as an accommodation between the wide nave arches and those in the choir polygon. The Prague ground plan also shows, that the architect in designing the spans etc. employed whole numbers as a basis; the middle aisle is 20 ells wide, the side aisle 10 ells, and a choir arch is 5 ells.

Note 59. From Essenwein's drawing.

113 89. Main Choirs without Ambulatory or Chevet.

There is still another kind of main choir. It has no ambulatory and consequently no chevet chapels. It places diagonally the altar apses terminating the side aisles, thus creating a rich choir ending. This is indeed first exhibited by S. Yved in Braisne near Soissons, then S. Martin at Ypres, the Liebfrauen Church in Treves, the Foundation Church in Xanten, the Church S. Catherine at Oppenheim and the Church S. Elisabeth in Kaschau.

The choir and transverse aisle of Oppenheim (Fig. 185) were begun in 1262; the general design of the nave also dates from that time.

Concerning Church S. Elisabeth at Kaschau in Hungary (Fig. 186), no statements relating to its origin have been preserved. Since the French lilies play a great part in the ornamentation, it is assumed that it was erected under Charles I of Anjou and after 1307. Originally planned with five aisles, the old plan was apparently given up in the construction of the internal piers, and the church was built with three aisles.

When we have considered the transformation of the choir apse from that time, when Romanesque art adopts Early Christian traditions, when we have seen how the different requirements have created from the simple semicircular apse the Gothic main choir with ambulatory and chevet chapels, how necessity and the requirements together with rich artistic imagination, have shown themselves as the most fortunate force impelling toward novel treatment, never seen before, then must a splendid example be thereby presented for what we understand by a "reasonable style of architecture" and "artistic imagination" in opposition to "caprice" and the "fantastic."

Let us yet glance at the point of the compass toward which the choir pointed. The early Christian churches did not have the choir at the east but on the west, since the priests stood behind the altar facing towards the people; thus toward the

east. Therefore nearly all ancient Roman churches do not have the choir at the east but at the west -- thus also S. Peter in Rome.

In the Romanesque period it was already usual to turn around the churches with their choirs on the east. Yet this was not by compulsion; the churches of the later middle ages, which were built new between blocks of houses, were adapted to the streets and the traffic in them, without always retaining the eastern direction. But even these churches, which are turned toward the east differ from each other, indeed because the magnetism of the earth suffered variations, and the magnetic needle was thereby diverted. Wehner called attention to this in the source mentioned below.⁶⁰ In 1580 the variation towards the east amounted to $11^{\circ} 30'$, and in 1814 it was $22^{\circ} 34'$ toward the west.

The longitudinal axis of the choir commonly deflects from that of the nave, especially in French cathedrals. Men have endeavored to explain this as a reference to the inclination of the head of Christ on the cross; yet this is surely incorrect. Rather must the ancient direction of the nave have determined the new one by the foundation walls, while the choir was then so directed as the magnetic needle required.

Note 60. In Denkmalfpflege. 1899. p. 97.

b. Crypts.

91. Origin.

The design of crypts beneath the choirs of churches is very ancient and is indeed a remembrance of the catacombs. In any case we already see at about 820 Einhard's basilica at Steinbach equipped with a beautifully vaulted crypt, and the perhaps contemporary plan of the Monastery Church of S. Gall also exhibits a vaulted crypt. Yet the crypts of this period are properly but vaulted passages, adjoining which beneath the high altar is a blind alley -- the tomb of the saint. The catacombs were partially known to this period. The saints were taken therefrom after the 7th century, and thus men also sought to imitate these passages at home.

These were later enlarged into complete cellars, whose ceilings were vaulted and supported by columns. Such a two-aisled crypt is shown by the Monastery Church at Jerichow (Figs. 187 -

139 ⁶¹), and a 3-aisled one by S. Micchele in Pavia (Fig. 170).

115 One of the largest crypts is that beneath the Cathedral at
116 Gurk (Fig. 171 ⁶³), since it extends beneath the side aisles:
a forest of small columns supports the ceiling.

Note 61. From Adler.

Note 62. From De Darstein, F. *Etude sur l'Architecture lom-
barde et sur les origines de l'Architecture Romano-Byzantine.*
Paris. 1865 - 1882.

Note 63. From Mitt. d. Central Commission.

In Trebitsch (Fig. 172), some heavy misfortune must have occurred then before the completion of the crypt; for the board centerings, on which the vaults were constructed about 1200, were never removed. Furthermore, the southern chapel of the crypt, drawn in Fig. 172, is wanting, like the apse lying above it, together with the end bay of the side aisle.

A very ancient crypt is that of S. Benigne at Dijon (Fig. 173). Abbot Wilhelm had it built about the year 1000. It is a complete lower church.

In S. Philibert at Tournus (Fig. 174), the crypt extends beneath the entire choir with ambulatory and chapels.

With the beginning of the 13 th century, the crypts abruptly disappear.

Note 64. From Heider, von Eitelberger & Hieser.

c. Transverse Aisle.

92. Date of Origin.

Let us now turn to the transepts or transverse aisle. A cross is already shown by the churches of Constantine the Great, thus particularly the old Cathedral of S. Peter at Rome. Yet the Early Christian period favored the transepts less. Frankish architecture first appears to have so developed the cross church, as the Romanesque possessed them. The S. Gall ground plan (see the plate next page 65) also exhibits a
117 cross-shaped church. Likewise is the Church of Einhard at
118 Steinbach-Michelstadt a cross plan; yet for the latter, the transverse aisle is lower and narrower than the middle aisle. The churches after the year 1000, if built in cross form, chiefly show a developed plan; transverse and middle aisles are of equal width and are of the same height. Also the accenting of the crossing of both aisles by a tower, the crossing

119 tower, or by a mere roof turret, is already found fully developed at this time. There are indeed churches with two transverse aisles behind each other, thus the Abbey Church of Cluny, or with a transverse aisle each at the eastern and western choirs.

As already stated in Art. 77, in the Romanesque period appears the custom of arranging two opposite choirs, one at the east and the other at the west. The particular reason for this arrangement is still unexplained. Perhaps the western choir served as a parish choir for the parish community of the cathedral or of the monastery. With these two choirs occur two transverse aisles and with them are also two crossing towers. Thus in S. Michael's Church at Hildesheim.

Moreover, the transverse aisles were also accompanied by staircase towers, so that men could ascend to the roofs, and this is already shown by the Church S. Michael at Hildesheim, which the holy Bishop Bernward had erected about 1020, that rich and extremely picturesque design.

At the close of the Romanesque period, the Cathedral of Worms emulated it -- and is one of the most splendid examples of the employment of towers in the entire middle ages.

98. Endings of the Transverse Aisle.

The transverse aisle either ends in square form, thus being rectangular, or with semicircular plans like the choir, which later became polygonal.

Such rectangular transverse aisles are exhibited by the Cathedral at Gurk (Fig. 175⁶⁴) and by S. Michele at Pavia (Fig. 176⁶⁵). In both churches the little Romanesque windows are very noticeable. The transverse aisle at Gurk is a later addition and shows the elongated windows, as they already developed in the transition style, contrasted with Romanesque peculiarities. The exterior of S. Michele shows, as appropriate in Italy, still fewer window openings than Gurk, and which are also unnecessary in Italy. A wealthier period commenced to construct a dwarf gallery along the longitudinal aisle, yet this stopped at the beginning. In the Romanesque period, one very commonly sees, that the old simple churches were later adorned in the richest manner by blind arches and arcades, as also in Andernach.

Note 64. From Heider, von Eitelberger & Hieser.

120 *Note 65. From De Dartein.*

121 While the French from the early Gothic period almost exclusively employ the rose windows for the transepts -- the best known example being the transverse aisle of Notre Dame at Paris (see the adjacent plate) -- there became naturalized in Germany a great elongated window. It so appears in sandstone at Zwettl (Fig. 177 ⁶⁶) and in brick at the Cathedral of Stendal (Fig. 178 ⁶⁷).

Note 66. From Heider, von Eitelberger & Hieser.

Note 67. From Adler.

Likewise the treatment of the gable essentially differs in Germany and France, in that the French gable is almost always accompanied by angle towers or finials at the sides, while the latter are almost invariably wanting on German gables. The paneling of the Stendal gable has fallen entirely out of scale and has a very clumsy effect. The gables in the adjacent Brunswick region are almost all defective by similar ugly panelings. Yet the crowning of the gable by steps and battlements is highly picturesque. The brick architecture also for churches makes far more use of decorated panels and surfaces than does cut stone Gothic.

A similar solution for the transverse aisle is shown by the Church S. Stephen at Tangermünde (Fig. 179 ⁶⁸). Its transverse aisle dates from the year 1470; for it is of the same age as the choir, in which remains the following inscription:--
"Anno domini 1470 feria quinta ante palmarum at honorem dei inceptus est; chorus iste - - -."

Note 68. From Adler.

The gable of the holy sepulchre at the Monastery Church Heiligengrabe in the Mark (Figs. 180, 181 ⁶⁸) may here be included as beautiful example of the development of rich brick gables. They likewise originated at about the same time as the transverse aisle of Tangermünde.

94. Circular and Polygonal Endings.

The most splendid plan with round endings of the transverse aisle is at S. Maria im Capitol at Cologne (consecrated in 1049), Great S. Martin (consecrated in 1171) and S. Apostles where (about 1199). An example with polygonal ending is the

Liebfrauen Church at Roermond (Fig. 182); this has attained the same success as its Rhenish sister, S. Quirin at Neuss. It also received its vaults only later, indeed in the early Gothic period, at the same time with a new western structure. Its Romanesque parts are very plainly divided between the earlier nave and the later triple apsidal structure. The documents also here lead to erroneous conclusions, considered alone.

If on the tomb of Count Gerard von Geldern was formerly to be found the following inscription upon a slab, the word "monasterium" does not refer to the Church:-- "Obiit anno millesimo ducentesimo vigesimo nono (1229) ipso die Beati Severi Episcopi, Gerardus comes Gelriae et Zutphoniae, qui cum Margareta uxore sua ad instantiam matris suae Richardae de Nassovia, primae huius loci Abbatissae monasterium fundavit anno millesimo ducentesimo decimo octavo (1218), ambo in hoc loco sepulti." The church already existed in the year 1218 with its polygonal transepts. It was probably vaulted at its transformation into a monastery church and was then finished with the new western structure.

No altar generally stands in these polygonal apses.

Early Gothic art adopts this development of the transepts. Thus the Liebfrauen Church at Treves (begun in 1227) and the Church S. Elisabeth at Marburg (begun in 1235) received polygonal transepts.

It is clear, that the transverse aisle greatly increases the space in the vicinity of the choir, the altar space, thus affording room for a considerable number of worshippers, where they could see and hear well, so that especially for basilican designs, the disadvantages of the side aisles are at least eliminated at this important place.

d. Crossing and Crossing Tower.

Crossing Towers in Germany.

The idea of accenting the crossing of the longitudinal and transverse aisles by a tower is very ancient. The Tomb of the empress Galla Placidia at Ravenna already (after 430) exhibits a small cross plan, whose crossing is marked by a low tower structure. It is visible internally as an elevated dome.

One of the earliest crossing towers in Rhenish art, that has

been preserved, is that of the little double Church of Schwarzhindorf near Bonn (Fig. 183⁶⁹). The cathedral provost Arnold von Wied, later Archbishop of Cologne, laid the corner stone in 1149 for it on his paternal estate, and it was consecrated in 1151 -- one of the numerous proofs, that building was also rapidly carried on in the middle ages, if the means existed. Yet the church was lengthened later, when a convent of nuns was added to it. It was previously a Greek cross. Both stories are vaulted. Only in the covering vault of the lower church is formed a small opening. However, the divine service is heard as plainly in the upper church there, as if it were held in the transverse aisle.

Note 69. From Bock.

Double chapels were then great favorites in Germany. The best known are those at Freiberg-on-Unstrut, at Eger, at Nuremberg, at Goslar etc.

The crossing towers at Laach (Figs. 182, 183) are of the same age as the tower at Schwarzhindorf; they were consecrated in 1156. The same is true of the dwarf galleries, which here or at Laach may be regarded as the oldest known on the Rhine. The vaults contain paintings of that period, that have not been restored too carefully.

From the same time dates the both massive and splendid crossing tower of Great S. Martin at Cologne (Fig. 184⁶⁹). Great S. Martin was a Scotch monastery, i.e., Irish and Scotch monks came for centuries to Germany after the time of S. Bonifacius and there founded monasteries. The church originated in three building periods, entirely separated according to the details. It is visible on the exterior, that the crossing and its tower does not suit the nave, and did not come from the same inspiration. These two parts are likewise separated internally. Yet while the crossing and choir from bottom to top originated from the same impulse, both externally and internally, this is not the case with the nave, for this shows two different hands. Early Gothic forms are visible in the triforium (in the passage beneath the windows) and on the vault of the middle aisle, while all else is Romanesque. If the vault be closely examined, it is apparent that it was constructed later; consequently a Romanesque basilica with horizontal ceiling existed earlier.

The question now arises, did the latter exist rather than the crossing structure, or is this the older? The latter is impossible for the following reasons. The two western angle turrets of the splendid crossing tower stand on the vaults of the side aisles, indeed on one corner of them. Since it was impossible to insert these vaults beneath the tower structure later, they must therefore be older. The two following statements concerning the building have been transmitted. The church was completed in 1171, as already stated, after the monastery had previously existed since Pippin's time, and Brother Otto the Great, Archbishop Bruno, as well as Archbishop Warines are mentioned as restorers of the monastery. Further, a document of an Abbot Symon (between 1206 and 1213) has been preserved, in which he states, that Rudengerus, who labored most faithfully on their church, had endowed anniversary (masses ?) for himself and his two wives. Rudengerus evidently constructed the early Gothic vaults, because "faithfully laboring in the construction of our church." The date of about 1210 suits these forms well. On the other hand, the church with its new crossing structure was consecrated in 1171.

96. French and English Crossing Towers.

The most colossal crossing towers were planned and commenced by the French and English Gothic. Yet no French crossing tower has been completely preserved for us, since even that of Rheims was burned. Viollet le Duc, with the pencil of genius and his unequalled knowledge of mediaeval buildings, has constructed on paper a cathedral with its complete ornamentation by towers, with the crossing tower rising above all else (Fig. 185⁷⁰), indeed just as architects about 1230 would have designed it. Is there any nobler or grander creation? What a departure from the Grecian temple! What a gigantic advance in ability, science and in the formative powers! What fruitful imagination of the artist in contrast to that, which produced the temple! The architects have created during a single century the basis for a never previously seen or existing wonderwork; in Greece, the same temple scheme with 6 or 8 columns was drawn and scarcely changed during six or seven centuries.

Note 70. From Viollet-le-Duc.

What is the technical work of a Grecian temple in comparison

with a Gothic cathedral? And what justification has the absolute, one-sided and excessive praise of these Gothic structures and the exclusive study of them!

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e. Roof Turrets.

97. Roof Turrets.

If it were not possible to erect a massive crossing tower, men were then satisfied with a wooden crossing tower, which was then covered with slates or metal.

For the smaller churches, the wooden crossing tower shrinks very much and becomes a "roof turret." These roof turrets then likewise occur without a transverse aisle, then sitting on the ridge of the roof, where they were needed -- for they contain the mass bell -- or where the sky line of the church made it seem advisable. On Rheims Cathedral, such a roof turret crowns the apex of the choir roof. On Magdeburg Cathedral, it stands at the west of the intersection of the transverse roof with the ridge of the nave.

A very charming roof turret, almost entirely preserved, is possessed by the Cathedral of Eu (Fig. 186⁷¹), from the 15th century. The entire structure rests upon the four corners of the crossing. Four oblique frames A, B, C form the support on which rests the octagonal spire. This spire has at its centre a continuous vertical timber, the emperor beam, with which the eight hip rafters are properly connected by struts and ties. The whole is covered by slates; only the exposed wooden parts of the graceful gallery and the vertex, which no longer remain, were covered with lead. The left side of the rafter X of the tower corresponds to the line B I in the plan; the right side is a diagonal section through the spire window. At M is represented the plan at the height of the external gallery, and the same in Q' at the height G.

Note 71. From Viollet-le-Duc.

127 A simpler sketch shows the roof turret of the Church at Orbais near Rheims (Fig. 187⁷²). It is entirely slated. The octagonal spire rests, as for most roof turrets, so that four of the hip rafters strike the ridges of the longitudinal and transverse aisles. The four other hip ribs then stand in the valleys of the roof and can be joined together by diagonal frames. The side walls of the square lower portion are framed

into the corresponding roof trusses. The beam C D in the elevation A of such a side wall is the strut of the roof truss. These side walls are inclined upwards, so that the square lower part is 16 ft. wide below and only measures 15.3 ft. above. In the good period -- this roof turret still dates from the 14 th century -- such substructures are almost always diminished upwards. Only in the late period were they vertical. The sketch B shows the plan at the beginning of the spire, and the sketch beneath is the diagonal section below the little angle turret.

Note 72. From Viollet-le-Duc.

f. Church Aisle.

98. Clearstory Walls and Colonnades.

The church aisle suffered a transformation, at least in plan. In the Early Christian period predominated these churches, the clearstory of which has walls supported by colonnades. Above these colonnades were laid either the long horizontal architrave, or arches were turned between the columns. Thus the middle aisle was very wide and the side aisles narrow, so that one can scarcely conceive a better and more beautiful solution of the aisles of a parish church. Splendid examples are S. Apollinare Nuovo in Ravenna and S. Apollinare in Classe near Ravenna.

These colonnades have made a great impression upon all ages. The expression in the ancient documents is explained with difficulty; "modus romanus" or "scema romanus" (Roman method) chiefly designates these colonnades.

Romanesque art therefore frequently imitated these and indeed thereby created such internally visible and appropriate churches, that the artistic impression was not obtained at the cost of the requirements. Those rows of slender columns with their high clearstory walls already caused great dangers during the construction, therefore the statement is common, that the walls fell when they were almost up to the roof. When the roof and ceiling once burned, then the walls generally fell quickly. Men therefore sought to insert stronger parts, and thus a column was alternated with a pier, or two columns with one pier, or even three columns with a pier. These walls already have greater stability.

One of the best known examples is S. Michael's Church at Hil-

Hildesheim (Figs. 188 - 191 ⁷³), that S. Bernward caused to be erected in 1000 - 1022. This building has certainly not come to us in its original form. If it were already reduced to ashes by lightning in 1034, then it again burned down before 1186, was splendidly rebuilt and consecrated anew. The church lost its eastern choir later, as well as the south transept and the spire of the tower. It is otherwise entirely preserved. From the time of S. Bernward date all piers, the columns in the northeast angle and those in the transepts. Simple tasteless cushion capitals with very strongly projecting flat abacuses characterize these columns, together with relatively low bases. The other columns, which evidently date from the rebuilding before 1186, exhibit the richest treatment of the capitals with Romanesque foliage in Saxon fashion. The bases are extremely large and have corner leaves.

Note 73. From Moller.

In the middle aisle has been preserved the pointed ceiling from that time (before 1186), the so-called Barbarossa ceiling, representing the tree of Jesse on a blue ground, an excellent work. The soffits of the arches are decorated by attached scrollwork in plaster, and the spandrels in the south side aisle are furnished with stiff maidens. On the other hand, the beautiful choir screens, that have remained from that time, exhibit on their north side very good sculptures of half height; these are likewise applied in plaster. They represent S. Maria, S. Bernward and other saints, and they are covered by interesting domed canopies.

In the northwest transept have been preserved from Bernward's time three arcades above each other (Fig. 189), which for the first time exhibit a dwarf gallery in their upper series.

In many countries, Romanesque churches show only square piers beneath the clearstory walls, as in Cologne and on the lower Rhine. These piers were also not especially massive, even if they obstructed the view more than columns.

99. Clearstory Walls on Massive Piers.

When men proceeded to the vaulting of this middle aisle, the columns showed themselves to be entirely unsuitable; piers of massive cross section were required. And thus prevails for a long time in the struggle with the vaults the impropriety, that

the side aisles were separated from the middle aisle by great masses of piers.

This condition, least appropriate for the needs of the worshippers, the modern period has adopted, and that so prides itself on its arithmetic and its "advance in construction". Men rejoice in the "picturesqueness" of these interiors, extol the "prayer angle" as highly beneficial for souls, and find the rows of piers and columns too beautiful for them to be missed.

This is the "Renaissance", to employ beautiful forms and details for themselves alone, not on account of the requirements, or even opposed to appropriateness. This is not mediaeval. No germ of new art treatment lies therein.

The architects of the middle ages soon worked out the medium between the requirements of the vault and those of the use of the church interior.

100. Hall Churches with Slender Piers.

In the cathedrals and monastery churches themselves, in which the side aisles actually represented merely stately passages, which made possible the passage without noise and without disturbing the worshippers and hearers, and that were not intended to receive the believers during divine services, the cross sections of the piers were ever reduced and the angles of the piers were so removed in their principal outline, that they stood with their diagonals in the longitudinal direction of the nave and did not obstruct the view toward the aisles.

In the great parish churches, men decidedly departed from the basilican scheme and now scarcely erected any but hall churches, whose piers could be thinner and set at greater intervals, than was possible for basilicas. This transformation of the cross section of the Gothic churches even took place during and by the development of Gothic. If the Gothic style had passed through its highest triumph during the early Gothic period and in the basilican cathedral created by it, then was the lifeblood of the Gothic by no means exhausted thereby, nor was its life ended for a long time. For centuries the Gothic bloomed in the most complete individuality, proposed new problems and solved them, and not merely in cross section and ground plan, but also in all details, even to the filagree-work of late Gothic spires.

131 To recognize the Gothic only in the early Gothic basilican cathedrals, to determine therefrom the nature of the Gothic, and to explain all else not presented by these cathedral buildings as ungothic or not Gothic, would be to entirely ignore the nature of mediaeval art!

g. Vaults.

101. Wooden Ceilings.

Let us now consider the origin of vaults over churches. This is truly the generation of the entire church aisle, internally and externally.

The Early Christian basilicas were not vaulted. The attempt to vault them was apparently never made. This is the more surprising, since the Romans had possessed such vaulted interiors for a very long time, thus for example, the Temples of Rome and Venus. The Early Christian period also busied itself with the most varied problems of vaulting, that it solved in the most famous way, as shown by S. Vitale at Ravenna and S. Sophia at Constantinople.

Romanesque art persisted in the traditional basilica with wooden ceiling, and it properly never progressed beyond this in Germany.

The windows in the clearstory walls are chiefly arranged there without axial subdivision and without reference to the lower arcades, so that in the later vaulting in the Gothic period, this arrangement of the upper windows was then discovered to be an irregularity and produced an embarrassment for the later architects.

102. First Vaults in Germany.

The earliest Romanesque middle vaults in Germany appear to be those of the Monastery Church of Laach (Figs. 192 - 196). It was probably already completed in 1112, since about that time the second patron of the church building, Heinrich, Count Palatine, speaks in a document of the completed church, and the outwardly inclined columns supporting the vaults seem to have been foreseen originally. The consecration of the church by the Treves Archbishop Hillin (1156) relates to the western apse, added by the abundant means of Countess Hedwig von Are, together with the eastern towers and the raising of the eastern and western cross sections A particular strengthening of the clearstory

walls against the thrust of the cross vaults without ribs was not provided; also cross vaults still show no ribs. It is one of the few vaulted Romanesque churches of Germany.

103. Connected System.

In its vicinity is still found a small vaulted Romanesque church, that at Niedermendig, and further up in the Eifel is the Church of the former Premonstrant Monastery Steinfeld. The documents are entirely silent concerning the latter; only a stone built into the church announces:-- "This church was founded in the year of the incarnation of our Lord 1542."

Thus the Steinfeld Church is a contemporary of Laach. Both solve the problem that all vaults should have a square ground plan, and that the side aisles be approximately half as wide as the middle aisle, two vaults in the side aisle always corresponding to one of the clearstory.

It is desired to explain the so-called connected system, that men intended only to place round-arched cross vaults in contrast to pointed ones only above square ground plans. This is entirely erroneous. This is the case for Roman cross vaults, which arise from the intersection of two cylinders. But as soon as the compartments are constructed, not as cylinders, it is entirely immaterial, whether the vaults are made round-arched or pointed-arched. The round cross arch exerts more thrust than the pointed one; but this includes every difference. For the diagonals remain semicircular through the entire middle ages with slight exceptions, in spite of the pointed architecture. Likewise the construction of the round-arched cross vault produces no greater or no other differences than the construction of the pointed-arched cross vault.

Thus the first round-arched vault, which we meet with over a clearstory in Germany, that at Laach, exhibits no square cross vaults and no connected system.

In Steinfeld, on the contrary, we find the connected system completely worked out. But as before stated, this is no particular characteristic of Romanesque art, especially not in Germany, where the Romanesque churches almost exclusively possessed merely wooden ceilings. On the contrary, the connected system chiefly occurs during the transition style, and indeed just with pointed arches in the cross vaults. At that time the

clearstories first received their vaults.

104. Vaulting of the Middle Aisle.

The side aisles of the Germans were indeed frequently vaulted; but the French invented the vaulting of the clearstory. They discovered the means and method by which the clearstory might be vaulted with safety. For the species of vaulting, as we see it in Laach and Steinfeld, without flying buttresses and buttresses, chiefly owes its stability to blind chance.

Furthermore, we find not merely in the Eifel and its spurs the endeavor to vault the middle aisles of large churches during the Romanesque period. Such a centre of the art of vaulting occurs on the opposite border of Germany on the Elbe (in the brick country), somewhat later in its appearance.

The Cathedral at Lubeck, for which the corner stone was laid under Henry the Lion in 1173, appears as an entirely vaulted structure; the entire nave and the transverse aisle are still preserved. This church also exhibits the connected system, even if the side aisles were rebuilt at the end of the early Gothic period, and one must therefore conjecture the form of the side aisles. Here were also plainly galleries over the side aisles. Since these became superfluous later and obstructed the interior, they were removed and the side aisles were so raised, that the cathedral is now a hall church.

While the Cathedral at Lubeck was vaulted from the beginning, the Church at Ratzeburg was only later supplied with cross vaults. Its middle aisle exhibits such already with pointed arches and also without ribs.

Further such vaulted brick churches are the Churches at Arendsee (consecrated in 1184) and at Diesdorf (consecrated in 1161). The latter is thus the oldest known brick church, which is vaulted.

Between these two chief regions of vaulted churches in the Romanesque period, there is the principality of Waldeck containing a number of small Romanesque village churches, that are all vaulted; thus at Benndorf, Twiste, Adorf and Flechtdorf. Yet documents and dates are wanting.

All these vaultings have no strengthening by buttresses or flying buttresses, at most having very thick walls in the brick regions. The vaults are the old crypt vaults.

While we do not see anywhere in Germany any structural progress,

the French constantly exerted themselves in the vaulting of the middle aisles, especially in southern and western France. They could indeed employ all their money and their superfluous men in the better and more energetic development of their own country. Germany only gradually arose after Charlemagne, and therefore ever new domains must be hastily supplied with churches and bishoprics; innumerable numbers of men constantly streamed to the east from the Rhine, the Moselle and the Danube. A cheap style of building, which quickly led to the aim, was therefore necessary everywhere in Germany.

137 On the contrary in the interior of France, the art of vault-
126 ing was further developed after the fall of the Roman empire without interruption. The Minster at Aix-la-Chapelle shows how it had advanced in the time of Charlemagne. The late Roman art was not destroyed by the invasion of the Germans. The old population remained, but under new masters; it was never exterminated. This is already proved alone by the Italian, French and Spanish languages. With this old population remained the old art and science, as well as the architecture and therewith the art of vaulting. Hence we read in the works of S. Gregory of Tours, of S. Fortunatus of Poitiers and their contemporaries of splendid and great church buildings under the Merovingians.

The Minster at Aix-la-Chapelle exhibits almost every form of vault in use. The lower ambulatory is furnished with cross vaults, indeed with four compartments over squares, as well as with three compartments over the triangles between them. These cross vaults naturally have no strength of ribs under the diagonal groins. The upper ambulatory is vaulted with rampant tunnel vaults over the squares, which oppose the thrust of the central dome. This inclined position is evidently no "accident", but originated from the correct feeling, that the thrust of the dome could be met in this way. The stiffening tunnel vaults indeed do not rest against the dome, but only below on the drum, and thus reduce only the height of wall of the drum to be overthrown.

In this indeed lay a difficulty, that the architect did not master in the vaulting of the clearstory. In the domical and
137 tunnel vaults, the windows are either in the lower part of the

vault itself -- and this expedient had been introduced by Early Christian art in its domes -- or they must be placed in the wall below the springing of these vaults, and the Romanesque art of southern France did this in case of their longitudinal tunnel vaults over the middle aisle. In the last case, the stiffening of the tunnel vault naturally was very difficult or impossible.

At the Minster in Aix-la-Chapelle, the architect furnished the drum with buttresses, at each angle stand two buttresses supplied with a sort of capital, and these stand on the edges of the rampant tunnel vaults; the windows are opened between these buttresses.

Thus the cross section of the Minster of Aix-la-Chapelle properly exhibits all the parts of a vaulted middle aisle with buttress vaults, buttresses and galleries, indeed in a perfectly intelligible and reasonable arrangement. Its architect -- Odo of Metz -- completely controlled the play of forces in his vaults, and this could have been transferred to a nave without special difficulty.

105. Transverse Tunnel Vaults.

In the north and east of the Frankish empire, as already stated, men later had no opportunity to think of vaulted churches. Numerous and rapidly built churches were the solution. Hence wooden ceilings for the most part in all these aisles, and also over the galleries. We only meet with detached attempts -- aside from the crypts. Such a one is shown by the western part of the Foundation Church at Werden, the Church S. Peter. The vaults of its side aisles probably date from about 943, in which a consecration is mentioned. Every lower bay is vaulted with a transverse tunnel vault, which itself rests on a semicircular cross arch. In case this transverse arch receives a suitable abutment, this is an excellent solution, since no difficulties at all were then found in inserting the windows with sufficient width and height.

In fact we find this solution in Burgundy on S. Philibert at Tournus (Figs. 197, 198 ⁷⁴) over the middle aisle (after 1009). The cross section (Fig. 197) shows how fortunate this solution is for the lighting of the upper vault -- the transverse tunnel vault --, without depriving the supporting cross arch of

its abutments. These cross arches rest so low on account of the tunnel vaults, that they are stiffened by the cross arches of the side aisles.

From an artistic standpoint, naturally very little can be said in favor of this arrangement. It is not beautiful. It has found few or no successors. On the contrary, men first occupied themselves with longitudinal tunnel vaults in the most varied ways.

Note 74. From Dehio & von Bezold.

106. Longitudinal Tunnel Vaults.

The preferable solution was the hall form. All these tunnel vaults were placed beside each other at equal heights. The crypt vaults had this arrangement and had approved it as excellent. What would be next, but to attempt this kind on a great scale? And indeed only strong walls for the side aisles and good mortar were required alone, in order to finish without accident. Thus it appears in the old nave of S. Nazaire at Carcassonne (Fig. 199⁷⁴), at Lerins and Souvigny.

Yet most architects endeavored to raise the middle tunnel vault higher, at least so high, that the vaults of the side aisles only intersect the imposts of the middle tunnel vault, so that two solutions are found:-- that the middle tunnel vault is either accompanied by two half tunnel vaults, as in Grandson, Fontfroide and Silvacanne (Fig. 200⁷⁴), or that the side aisles are covered by two series of cross vaults, as at S. Savin, Chauvigny and Notre Dame le Grande at Poitiers; yet then the middle tunnel vault remains without windows. This design is also found furnished with galleries: thus S. Sernin at Toulouse (Fig. 201⁷⁴), Notre Dame du Port at Clermont-Ferrand, S. Paul at Issoire and Conques.

In a very remarkable way, this form of solution appears in the high and late Gothic periods in Austria. Freistadt in upper Austria (Fig. 202⁷⁵) and Göss exhibit half cross vaults over the side aisles, which are arranged in a very intelligent manner as abutments for the middle aisle.

Note 75. From Wiener Bauhütte etc.

Others elevate the middle tunnel vault so high, that windows could be placed below its springing, and they stiffen the walls by the half tunnel vaults of the side aisles. But this is the most unreasonable arrangement, which only owes its preservation

to chance. It thus appears in S. Trophime at Arles (Fig. 203⁷⁶), the Cathedral at Vaison and S. Guilhem du Desert in the French department of Herault.

Note 76. From Dehio & von Bezold.

A development of these solutions did not appear in time. It cannot even be determined, whether these churches originated earlier than the churches with cross vaults in northern France, represent contemporary experiments, or are even later structures of the end of the 12th century. French archaeologists for the last 20 years have not extended at all the knowledge of the dates of their mediaeval churches. Their chief endeavors have apparently consisted in seeking faults in the works of Viollet-le-Duc, the giant. Viollet-le-Duc was an architect--there was their enemy! That they have not found substantial errors is evidence of the fact, that the knowledge of the architecture of the French middle ages is still the same today, as Viollet-le-Duc discovered it in his immortal works. Furthermore, every one that investigates the reproaches against Viollet-le-Duc, will be astonished by the baselessness of all the embittered charges against him.

107. Cross Vaults.

It cannot be understood, why the architects did not hit upon placing the windows in the base of the tunnel vault, as Early Christian architecture did in its domes, and where the remaining window piers were all furnished externally with strengthening buttress piers. Then the weak clearstory walls might have been omitted, and they would have obtained brightly lighted interiors. It was then reserved to the northern provinces of France to so vault the middle aisle, that it was brightly lighted and yet well furnished with abutments.

The cross vaults finally afforded a solution of the problem of securely vaulting the clearstory by means of a transformation or a strengthening. Certainly the change in the previous cross vaults and mere groins into those with ribs beneath them preceded, not in the clearstories, but in the side aisles and the ambulatories of the choir. It was not alone these ribbed vaults, that lightly maintained themselves as fireproof ceilings over the middle aisle -- men had also invented the flying buttress.

108. Bulging Cross Vaults.

Let us first consider the transformations experienced by the cross vaults. The Roman cross vaults are indeed without exception the intersection of two semicircular tunnel vaults, so that their springing lines are horizontal straight lines and the diagonals or groins are ellipses. The Early Christian cross vaults exhibit a flattening of the diagonal groins at top, so that these cross vaults look like a Bohemian compartment vault at the centre. The Romanesque cross vaults, which were developed from the late Roman provincial architecture, are actually constructed on straight lines like the Roman; but one frequently meets such with "bulges", the tops are no longer straight lines, but are curved or segmental arches. By this bulging of the compartments was naturally given to the diagonal groins a much more prominent cross section. But these cross vaults must be centered quite otherwise than those without bulges. For cross vaults composed of two portions of tunnel vaults, these parts have centerings. For those with bulges, the diagonal groins must first have entirely independent centres, and the swelled compartments must generally be built between these without centerings, perhaps by the aid of movable guides. Men would come as a matter of course to first set on the wooden centres of the diagonals a complete course of stones, that represented the independent diagonal arches and against which the compartments were then vaulted. Yet it cannot be proved, that just in this manner originated the ribs under the diagonals. In brief, fully developed and moulded, they existed in northern France about 1140, and they are earliest dated in the rebuilding of the Abbey Church of S. Denis near Paris under Abbot Suger.

109. Suger not the Inventor of Gothic.

That the abbot and imperial chancellor Suger did not invent the Gothic, indeed that he was not even an architect, appears from his own report of the rebuilding, which is as unprofessional and inane as possible; further from the general fact, that the architects at all times were laymen, that the clergy, the bishops or monks were never architects, save for those exceptions, that even occur today, and that all assurances of the history of art to the contrary are based upon erroneous translations.

Abbot Suger was a wise and strong man, who not only saved his abbey at the fall of the empire, but he likewise administered the empire for his king Louis VII, when the latter fought in the Holy Land. He had also taken charge of the disordered finances and met with a rebellious nobility; but in spite of the vast sums, that had to be sent to the king, the treasury of the state was full at his return, the castles were again rebuilt, and the nobles were under control. This was already sufficient for one man to perform, so that for this cause no time at all remained for time consuming activity in building.

But he was a ~~mere~~ ^{the} owner of the building. He did everything, even to selecting the great oak trees. He completely overshadowed the architects. Exactly as it is today:-- everything good in the building is due to the owner or his officials, everything bad comes from the architect!

1/2 The novelties in his building were entirely unknown to him. At all events, the cross vaults on ribs indeed were not invented in S. Denis, and they had not been first used recently. The ancient diocese of Soissons exhibits in its small village churches a great number of still remaining examples of such earlier ribbed vaults. Their dates are indeed not fixed by documents, and thus in spite of the industrious work of Lefevre-Pontalis 77, we do not see much more distinctly when this change properly commenced. At least already before 1100, and as already made prominent in Art. 103, particularly in the aisles around the choir, where the irregular forms of the plans of the compartments created special difficulties, that men mastered by the ribs.

note 77. L'architecture religieuse dans l'ancien diocese de Soissons au XI et au XII siecle. Paris. 1894.

110. Pointed Arch.

Apparently at the same time as the cross ribs, the pointed arch came into use. Whence it came, whether it was already there before the rib vaults, whether it came into use only after their invention, cannot be stated. The so-called arcades, i.e., the series of arches beneath the clerestory walls, appear to have first been made pointed, and later the transverse arches of the cross vaults. But neither the pointed arches of the vaults nor the cross ribs would have made possible the vaults over the clearstory, i.e., have made them stable, had not the

flying buttress been invented.

111. Flying Buttress.

The tunnel vaults, whether pointed or round arched, thrust against each part of the longitudinal walls, but the cross vaults only against the piers between the windows. The thrust was therefore only stronger there. If the tunnel vaults remained standing, then for the same thickness of the walls, these clearstory walls would certainly be overthrown by cross vaults. Men clearly understood this. For otherwise would the cross vaults have long been employed, for they were known since the Roman period, and they made possible clearstory windows beneath the vaults.

The flying buttress likewise plays the chief part in making possible the clearstory vaults. The vaults had even been known without ribs and without pointed arches, and even tunnel vaults with windows in their lower parts; the flying buttresses alone would have supported them, and the vaulting of the middle aisle, this problem of long centuries would have been solved. The pointed arch has only the praiseworthy peculiarity, that its thrust is less than for the round arch, and it thus lessens the problem of the flying buttress.

112. Diagonal Arches.

The ribs beneath the diagonals scarcely contributed anything thereto. Their function was the following. They first strengthened the cross section, particularly on the underside of the groins, where the greatest pressure was exerted on the material of the vault. Whether the architects clearly understood this will appear questionable, since we only recognize it by our statics, and one is so easily inclined to allow no theories to those times. Yet certainly with injustice. Even the name appears to show today their theoretical knowledge. They termed these "aigives" or strengtheners, from "aigere." Therefore in France such a cross vault on ribs is termed "croisee en ogives."

When in modern times men again busied themselves with the middle ages, this expression was not understood. Men took "croisee" for window and believed that "ogives" signified pointed arches. Thus in modern France by an error, just as the writers on art so frequently make in relation to the architect-

architecture unknown to them, the pointed arch came by its name of "ogive."

43 A further service of the diagonal arches is, that they form a kind of stone form, which permits a far lighter centering. A Roman cross vault or one without ribs never supports itself before it is entirely closed. Until then it with all its load rests on the centering. For cross vaults with ribs, it is only necessary to place centers under the ribs. If these are complete, then the compartments may be mostly set free with slight supports and struts between them.

If the cross compartments have no bulges, then these compartments only support themselves, when they are entirely closed; thus they must have centerings beneath. But if these compartments have bulges, then each course of the compartment supports itself. A special centering is unnecessary, except for making true the segmental arch of the bulge.

All other considerations, that round arched cross vaults can only be built over square plans, therefore that a square vault bay must always be arranged in the middle aisle for two square bays of the side aisle, half as large, therefore that the so-called "connected system" (Art. 103) thus originated is entirely groundless, as before stated, and one of the numerous errors.

As soon as men did not understand cross compartments as portions of cylinders, thus when the cross vault was not produced by two intersecting tunnel vaults; when men vaulted each compartment by itself, as required by the side arch, the transverse and diagonal arches -- then could men cover with the round arched cross vault the same ground plan, which the pointed one masters.

However the first flying buttress may have originated, it will almost appear as if the cross section of the half tunnel vault may have been its ancestor. The earliest flying buttresses, that seem to be still preserved, are very wide in proportion to their small height; they appear like narrow half tunnel vaults. They may also still be seen in Canterbury from 1180.

To wish to decide that the flying buttress is the truly essential part of the Gothic is however erroneous. The flying

buttress is the chief means, not to say the only expedient for vaulting the clearstory of a 3-aisled basilica. Yet the nature of the Gothic is thereby neither exhausted nor rightly comprehended. There are a hundred other structures, which do not need the flying buttresses and therefore do not have them, but which exhibit the best and purest Gothic. Thus the hall churches, churches of a single aisle, castles and secular buildings of all kinds.

Then certain connoisseurs and scorners of Gothic have also declared both hall churches and those of a single aisle to be not Gothic, and also all secular buildings indeed, only the basilican cathedrals of northern France being Gothic! They first misunderstand the nature of a thing under a hundred misconceptions, and they then declare nine tenths of the Gothic to not be Gothic at all. Why shall not all be Gothic? The Gothic never had beautiful and luxuriant profiles. A dry splay with water drip is all the richness of these connoisseurs of Gothic. Instead of the beautiful foliage, fine heads or bodies of men, occur champed and ragged monstrous foliage, caricatures distorted in execution and twisted forms -- the "jests of the stonemason."

A horizontal beam ceiling is not Gothic. Plain walls between windows without buttresses and without tracery, blind tracery or paneling is not Gothic. No doorway or furniture without pinnacles, flying buttresses and cusps. Only that is Gothic. How far have men come with this?

113. Bearing Parts.

Then return to the vaulted middle aisles. The ribs and cross arches of the cross vaults naturally caused a transformation of the supporting parts. If the transverse arches were already massive, the diagonal ribs also exhibited strong cross sections. There were soon added longitudinal arches treated as a large round. Supports must be created for all these arches. Therefore a pier was set beneath the transverse arch, and perhaps a small column on its front side. The diagonals rested on separate small columns. The longitudinal arches at first began without a separate support or on small corbels. Even the diagonals usually commenced on corbels. But the rich arrangement of small columns under the different arches and arch courses

were so charming, that they were soon retained with inspiration and developed.

In the beginning, these clustered columns did not extend to the pavement, they stopped on the lower capitals. They later extended through the capitals and transformed the columns of the nave into clustered columns. The elongated small columns are a new characteristic of the arising Gothic.

114. Vaults with Radial Ribs.

How freely the architects disposed of the new ribs is shown by the "vaults with radial ribs" of the Parish Church of Boppard (Fig. 204⁷⁸). This church also only received its clear-story vaults afterwards. Since the external height of the walls of the middle aisle did not permit the turning of pointed arches along the walls and the construction of true cross vaults, the architect turned a kind of pointed tunnel vault over intersecting ribs, that left free the small windows in the walls between them. Similar vaults are exhibited by an addition to S. Pantaleon at Cologne, as well as the galleries of S. Gereon, and in the most charming manner in the splendid Chapel of S. Matthias above Cobern. From the manner in which the architects employed the ribs in these "vaults with radial ribs", the course of their thoughts may be entirely read. The ribs make it possible to vault over any interior, whatever its form may be. Ribs are turned between all bearing points, that are not too far apart, slightly bulged compartments are turned between them, and thus it is possible to cover any interior without difficulties in execution or in stonecutting.

Note 78. From Bock.

115. Triforiums.

The architects further endeavored to get rid of the heavy clearstory walls, that required unnecessarily massive piers in the interior. The windows soon occupied the entire space within the side arches and there replaced the wall masses. Below them and at the height of the roofs of the side aisles, where at the highest were arranged openings for light toward the roofs, were constructed passages, the triforiums. Such a passage already bore the name of triforium in the middle ages.

The roofs of the side aisles were later placed over each bay as separate hip roofs, without extending to the wall in

the rear. These rear walls were then opened and glazed as windows.

The portion of the ground plan of Cologne Cathedral in Fig. 205 ⁷⁹ exhibits this reduction of the walls above the piers in the clearest manner. Outside is the thin rear wall of the triforium and inside are very slender piers and mullions. The triforium is roofed above by a gallery of stone slabs. Now the window piers alone extended higher, and a small column externally strengthens the impost of the flying buttress. The heavy load of the clearstory walls, of the vault and the roof thus rests upon these slender supports. Therefore the abutment of this flying buttress is made stronger. And indeed with justice. If these abutments are immovable, which have to receive the entire thrust of the vaults and the flying buttress, as well as the wind pressure exerted against the high roof and the entire upper part of the clearstory, then all these parts, which not only have to support vertical loads, like the internal columns and the window piers, may be reduced to the very least dimensions.

Note 79. From Schmitz, F. Der Dom zur Cö.n. Cologne & Neuss. 1868 - 1877.

Likewise it is evidence of the greatest experience and the most correct reflection, that this abutment of the flying buttress is secured against all movement sidewise by the doubled supports at the sides. The contemporary architects of the choir at Beauvais did not consider, and therefore this choir threatened to fall in the 14 th century.

116. Buttresses and Pinnacles.

The buttresses were at first only effective by their projection, that increased downward by offsets. The flying buttress also rested directly upon it. It was later found that a load on it permitted the reduction of the projection and weight of the buttress. Thus massive finials soon rose on all buttresses. This word "finial" (fialon) evidently comes from the French word "filleule" (little daughter). Wilas de Honecourt wrote "filliole" in 1244 as the name of the angle turret on a tower, and in the account of Prague Cathedral, it is termed "fiol."

117 The cross section of the Monastery Church at Goldenkron

(S. Bonemia; Fig. 206⁸⁰) shows how securely the architects of high Gothic mastered the vaults. This architect entirely omitted the buttresses. Instead of them, he constructed a very thick wall for the side aisle, placed thereon pinnacles in form of piers, and permitted the flying buttresses to spring from the imposts of the vaults of the side aisles. Thence he carried the thrust inward as far as possible.

Note 80. From Wiener Bauhütte etc.

The Cologne buttress system (see the adjacent plate) exhibits double flying buttresses, which are then stiffened by tracery balustrades. The uppermost arch chiefly serves to resist the wind pressure on the high roof. Along the top of these flying buttresses is usually conducted the rain water from the clearstory roof, which then flows through vertical channels in the buttresses to the gargoyles.

It is further entirely self-evident, that all these good and yet well considered constructions neither owed their origin to blind chance nor to "handicraft" practice." These masterpieces were the result of mature and fixed theories, which differed little from our own. All fabulous views relating to the "masters" of the middle ages, to the "lodges" and the "stonemasons' unions" could only originate, when the writers were mostly laymen, who lacked intelligence for the difficulties of such problems, were without practical experience, and who frequently possessed only a superficial knowledge of the documents.

That the Gothic architects had entirely correct opinions concerning the forces acting in these wonderful works is shown directly by the documents, -- aside from the astonishing play of the forces in the buildings themselves. We shall treat of them at the close of this Heft.

117. Vaults of Churches with One Aisle.

A particular treatment of the aisle naturally appears in the churches with a single aisle. In a remarkable way, only certain countries have liked this treatment of the nave and have preferably developed it; especially southwest and south France and northern Spain. In the Romanesque and Gothic periods, there arose these churches with one aisle in the most varied forms, which deserve the most thorough consideration. For in them lie germs of novel treatment, while the basilican

idea was actually employed in the greatest excess during the Gothic period and in the baldest monotony by intelligent and unintelligent men.

148 Since these countries on the north and south of the Pyrenees have transformed neither the Romanesque nor the early Gothic in a manner corresponding to their single-aisled churches, and since high Gothic has only left there very dry and tasteless churches, then would it therefore be advisable to make the German Romanesque forms, as well as the early Gothic, serviceable for these problems. In every respect -- both those of art and of needs -- much might be created anew. Only through new programmes may new solutions in art arise, and only through new individual endeavors can originate a new tendency in the art, if not an entirely new art. But it would be somewhat novel in the church programme of the present day, if suitability were placed first; for then the blind alley "basilica" would entirely disappear of itself.

150 The late Romanesque art of the then English portion of southwest France left behind it grand single-aisled designs. This art preferred a series of domes, which cover great squares of the nave, as at Angouleme, Fontevrault, Solignac, S. Front at Perigueux etc.

118. Series of Domes of Churches of southwest France.

These domes either have a small skylight, like the Roman Pantheon with a small lantern, or a circle of windows in their base, like the Early Christian domes of S. Vitale at Ravenna and S. Sophia at Constantinople. They are indeed often entirely without openings for light and depend on lighting from the low lying windows of the side walls. The arches supporting these domes are almost wholly pointed, a proof of the origin of these churches only after 1100.

likewise S. Front at Perigueux, which is held to be an almost contemporary imitation of S. Marco in Venice -- thus of about the year 1000 -- was first consecrated in 1147 by Aymon, Archbishop of Bourges, after the old church had been destroyed by fire in 1120. The ruins of this ancient church still remain near the existing S. Front, and some considerable injuries from fire are not lacking on S. Front itself. ⁸²

Note 82. S. Marco at Venice was burned in 960; the corner stone of the new building was laid in 977; the structure pro-

proceeded slowly under Orseolo II (991 - 1009. A consecration occurred in 1094.

A passage beneath the windows usually extends around the church, supported by an arcade on columns. The Paris Church S. Madeleine of the time of Napoleon is such a church translated into Renaissance.

Similar to the buildings of this school is in Italy S. Antonio at Padua, although this church is 3-aisled. Its nave exhibits a series of domes, like the contemporary or not much earlier churches of southwest France. Yet must it rather be an imitation of S. Marco at Venice, than that S. Antonio was an offshoot of the French school, like all other early Gothic Italian structures. We shall soon see the reason.

153
154 With the penetration of the Gothic of northern France into southern France, the domes disappeared, and in their places arose great cross vaults. These are indeed constructed differently from those of northern France; they continue the domes and therefore usually exhibit crown ribs as well as diagonal ribs. We shall return to these forms under the details of vaults.

For example, such buildings are the Cathedral of Angers and Notre Dame de la Coulture in Le Mans. A shoot from this advanced school in Italy is the sister Church of S. Antonio at Padua, namely S. Francesco at Assisi (Figs. 207 - 209⁸¹). This church was begun after the death of S. Francesco in 1228 and so strikingly resembles the churches of southwest France, that its architect Jacopo Tedeschi must have learned his art there.

Note 81. Dehio & von Bezold.

If one then sees how this Jacopo Tedeschi had learned and practised the style of southwest France, then would it be truly improbable, that another architect could have lived in Padua at the same time, who designed in the style of southwest France, and who appeared to be entirely uninfluenced by Gothic, that itself no longer existed in southern France at about 1150. For all Gothic details shown by S. Antonio were only added later. For S. Antonius, a Franciscan, died at Padua in the year 1231. His fellow citizens immediately decided to erect a great new church over his tomb. The church had progressed so far in 1263, that the body of the saint was transferred to it. The

structure was mainly completed in 1307.

The cross section of this church (Fig. 210 - 212 ⁸³) is that of a 3-aisled vaulted basilica, excepting that pendentive domes are arranged instead of the middle cross vaults. On the contrary, the side aisles are covered by cross vaults on ribs. The thickness of the aisle piers permitted the placing of a passage beneath the clearstory windows, as in the single-aisled churches of southern France. At the same place in the buildings of northern France, the triforium extends around the aisle.

But the entire method of construction shows that at first existed only a round arched church of a single aisle, and that the pointed cross vaulted side aisles were only added later; perhaps when the numerously attended pilgrimage churches became too small, or the domed churches without buttresses were cracked. The longitudinal section clearly shows the discordant treatment in the forms; for the lower pointed arches first became necessary as openings for the 3-aisled construction. The round arched clearstory windows entirely differ in treatment from those of the side aisles and from the lower arcades, even if also in France the pointed arch first appears in the arcades. But this occurs there about a century earlier. On the other hand, as already stated, the building is similar to S. Marco at Venice.

The architect of the single-aisled church must have been a very old man, when he received the charge, because he still built in the old forms of Italian art. This structure was likewise carried on very rapidly, since it exhibits the same hand to the top. The Gothicizing of the whole only followed after the middle of the 13th century, thus probably after 1263. When Vasari states, that the plan was by Niccolo Pisani, his activity may refer to the Gothic transformation.

Note 83. See Essenwein's drawing.

120. Internal Buttresses.

Sometimes the buttresses are also moved inward, so that great niches are produced along the aisle, which are then suitable as chapels for side altars, confessionals, and the like. Yet the school of southern France first utilized this opportunity. The churches of southern France and of Spain, which already employed the true Gothic buttress, systematically moved them inward

and thus created along both sides of the aisle chapels for very practical uses.

The Barocco period in particular, later took these forms as a basis for its designs, thus obtaining its great results for use in artistic as well as in practical respects. Why should modern Gothic alone omit this original invention of the Gothic?

These provinces possess the boldest vaulted spans of the entire mediaeval period. As already stated, the Cathedral at Gerona (after 1410; Fig. 213⁸⁴) has nearly 72.2 ft. span of the aisle with 39.4 ft. length of bay. Here a single vault is nearly as large as one half a parish church with all its little internal and external art works. The old aisle of the Cathedral of Toulouse in southern France is even of somewhat greater span (namely 73.8 ft). The Cathedral of Albi (begun about 1282) with its length of 295.3 ft. is the most complete and largest design of this kind. These colossal churches are based on Romanesque single-aisled churches, whose nave was covered by tunnel vaults. Such churches of a single aisle with tunnel are the churches at Saintes-Maries, Cavaillon, Orange, Montmajour, Beziers, Lairac and Saumur.

Note 84. From Dehio & von Bezold.

The succeeding churches with cross vaults likewise move inward the buttresses of the choir. We also meet with this procedure in Germany. Peter Parler encloses the rich chevet chapels of his churches at Kolin and Kutttenberg with a uniform wall below. The effect at a distance and on the general form is incomparably more beautiful and noble than the numerous unquiet chapels of the cathedrals of northern France.

h. Church Roofs.

121121. Form and Covering of Roof.

When we have thus examined the nave of the church in all its parts, there yet remains for consideration the form and construction of the roofs. As previously stated, in the Romanesque period the inclination of the roof was rather low and nearly always less than 45 degrees. If one can still cover roofs approaching a right angle with tiles or slates, roofs under 30 degrees, such as commonly occur on Romanesque choirs, require a different covering. The latter were therefore covered with lead, tin or copper.

With the entrance of Gothic the roofs always became steeper. Herein also do the mediaeval architects treat this Gothic style of architecture as thoughtful and consistently acting artists. The never failing source of suitability also here brought new forms to light. Metal roofs, which permit a less inclination, are costly. The everywhere common tiles and slates on the contrary are relatively cheap materials for covering roofs and with great durability and security against fire. These are truly monumental building materials, that defy centuries, if cared for. But they make a tight covering only when inclined at least 45 degrees. The steeper the roof, the tighter is the covering of slates or tiles. Which artistic procedure is now correct? Either to say:-- I find the roof necessary; the covering material everywhere afforded at a moderate price best fulfils its purpose the steeper it lies; consequently I show the roof; I make it a part of the artistic appearance of my building, and indeed since it is of the greatest importance for the building, and I freely assume the required greater steepness as a starting point for the transformation of the traditional roofs of low slope? Or one looks back to the antique low roofs, endeavors to employ the existing tiles and slates, obtained at moderate prices, for as flat a roof as possible without admitting rain and snow into the building.

157 And all this merely because the Greeks did not need a steep roof under their ever blue sky without our rains lasting for weeks and snow for months! -- And at the end, one has produced nothing but undecided sketches, that do not have the antique effect; for they are still not flat enough, and they therefore have the unpleasing appearance of unconquered necessity.

Yes, why should we long for the lowness of antique roofs and thereby deprive ourselves of the creative power of new forms and artistic outlines?

Why do men fail to recognize the great progress introduced in architecture by the Gothic, that those parts required by the structure be taken as the chief motives of the artistic appearance, be shown, and novel forms be created from their peculiarities?

122. Roof Framework.

How the roof framework was constructed during the Romanesque

period, it is hard to state, since such structures have indeed scarcely remained. The two roof framings of Maulbronn and Constance in Figs. 214⁸⁵ and 215⁸⁶ soonest exhibit their systems; all the trusses are similar.

Note 85. From Paulus, E. Das Cistercienser Abtei Maulbronn. Stuttgart. 1879.

Note 86. From Schober's drawing.

Gothic roof frameworks naturally remain from all the churches, even if those of the 13th century are also rare. One of the oldest is that over the choir of Notre Dame at Paris.

These mediaeval roofs exhibit in most countries a substantial difference from our modern ones. At certain distances (18 to 28 ft.), as permitted by the axial divisions of the building, a truss is set on each pier. These trusses support longitudinal purlins, upon which are fixed rafters at about every 3.20 ft. These trusses alone stand independently and combine all the required parts in themselves.

The mediaeval roof does not rely entirely upon trusses and purlins, but each pair of rafters is framed with struts and collar beams, so that at need it would remain upright. Besides the true rafters are the horizontal strips; furthermore the rafters of the truss are themselves employed as the supports of the strips, while also today on the truss, the rafters are only laid on the purlins, and separate struts are arranged for the construction of the entire truss.

The description of such a mediaeval roof structure will be most simply represented by this. Take the framework of the roof of the Minster at Ulm (Figs. 216, 217⁸⁷), which Jörg of Hall erected in 1474. The two rafters are shaped alike in their upper parts; two large struts cross between the upper parts of the rafters and stiffen them against deflection. The rafters must be supported at each 12 to 16 ft. The lower portions of the rafters are supported by two purlins, on which rests a cross beam. The supporting construction for these purlins has only the principals of the truss. Two struts with braces and collar beams compose this support as well as the principal, stiffening the roof against wind pressure. These struts and purlins are first erected and serve as a scaffold for the construction of the rest of the roof.

Note 87. After Hassler's drawing.

The trussed and intermediate rafters are properly just alike where, except that to the former are added the struts that support the purlins.

A second difference between the rafters further consists in that the trussed rafters almost always alone have at their feet the great tie-beam, which resists the side thrust of the entire roof. The intermediate rafters merely stand on short beams notched into the longitudinal plates. In order that the entire thrust of the intermediate rafters may not pass outwards, struts are inserted between the timbers receiving the intermediate rafters and the wall plates or between the latter alone.

The choir of the Church Frauenkirche at Nuremberg (about 1340) has rafters as represented in Fig. 218⁸⁸. The very high roof over the nave of the Church Frauenkirche (Figs. 219, 220⁸⁸), which is a hall church, utilizes the internal piers of the church. Since the nave stresses are not excessive, two other timbers are placed above the cross beams. By this means are supported all three longitudinal purlins. A large parallel strut stiffens the whole.

Note 88. After Essenwein's drawing.

This roof framing is built entirely like a modern roof, excepting with trussed rafters. The intermediate rafters are not made merely plain rafters. The longitudinal resistance of the roof is produced by plates and crossed braces, just as at present.

A quite similar roof truss is shown by S. Stephen at Vienna (see the adjacent plate), excepting that the roof is much higher and steeper, and the middle vaults extend into the roof truss. While the roof of the Nuremberg Church Frauenkirche also strengthens the transverse structure of the truss by two plates, two braces are there added at the feet of the struts. The lower part of the roof framework does not rest on the external wall, but on great corbels, since the added gables would interfere with the bearing. This also has the great advantage, that the wall plates and lower ends of the rafters are exposed to free circulation of air and therefore cannot dry rot.

The roof framework of the Cathedral of Rheims (Fig. 221⁸⁹), of the end of the 15th century, has a free span of nearly 46 ft.;

the principals and rafters are 55.8 ft. long. This truss chiefly consists of a great queen-post truss, whose tie-beam is 47.5 ft. long. The intermediate rafters are almost simple timbers, excepting that the lack of purlins in the upper part is replaced by small collar beams o and by braces n. The supporting of the purlins is quite unskilful.

Note 89. After Viollet-le-Duc.

The middle ages also constructed vaulted wooden ceilings instead of horizontal wooden ceilings over halls as well as over churches. In France are quite commonly found halls with pointed tunnel vaults, that are directly formed by the roof framework. The tie-beams are not omitted, but generally they pass openly through the interior.

These wooden tunnel vaults are rare in Germany. The Church S. Clara at Nuremberg exhibits a lightly constructed roof framework without tie-beams. (Fig. 222⁹⁰). Everything here certainly depends upon the stiffness of the rafters and the excellence of the framing. Furthermore, these trusses thrust strongly against the enclosing walls.

Note 90. After Essenwein's drawing.

The open framework of the roof was especially naturalized in England. The mild climate permitted this method of roofing. With the greater cold in Germany, since the woodwork was cold and was exposed to the moist respired air, it dripped and decayed.

A very beautiful example is offered by the Cathedral at Ely from the end of the 14th century (Fig. 223⁹¹). The great curved timber A B is in one piece; it is tenoned at top into the king-post D and at the bottom into the remnant of the tie-beam C. This beam C is supported by the curved strut resting on a small column I, and this stands on the corbel K. The remaining spandrels at E, F and H are stiffened by grooved-in boards. The whole naturally exerts a strong thrust on the enclosing walls.

Note 91. After Viollet-le-Duc.

The grandest roof framework of this kind is exhibited by the Hall of Westminster Abbey at London (Figs. 224 - 227⁹²). This is 68.9 ft. wide in the clear, the walls are 7.22 ft. thick and about 37.6 ft. high, the distance between centres of trusses is

18.8 ft. The truss chiefly consists of three great triangles; that at the apex, and the two spandrels resting on the wall. As at Ely, this lower triangle is supported by a curved strut resting on a corbel. The upper triangle is supported by the two great struts forming a pointed arch, which springs from the same corbels, intersects and stiffens the lower triangles. The struts forming the pointed arch principally consist of two great timbers placed beside each other and which are 30 inches wide. All spandrels and interspaces are filled with a tracery, which is over 11 inches thick. The angel on the horizontal beam is carved from a single piece, excepting the wings.

Note 92. From Dehio & von Bezold.

Finally, we even find attempts to replace the wood of the roof framing with stone.

If men had also found in the vaulting of churches a means of putting a stop to the complete destruction of the church by the burning of the roof, as generally occurred with wooden ceilings, then the wooden roof was still always exposed to destruction by fire. The high and steep roof trusses could indeed scarcely be replaced by masonry; on the contrary, this occurred earlier for flat roofs. Thus S. Francesco at Assisi exhibits a pair of diagonal masonry ribs as supporting the purlins (Fig. 208), a truly monumental procedure.

If the middle ages had only had iron at its command for the roof trusses, it would certainly have employed this building material eagerly, exclusively and constantly. Thus the Germans then immediately ~~have~~ endeavored, when they had seen and understood the French stone vaults of the middle ages, to replace their frequently burned wooden ceilings by the fireproof vaults, and they would just as soon have preferred iron roof framework to the constantly endangered wooden roofs. They would only have been repelled from that use of iron, which has today made itself the ruin of architecture, so that the architect draws any internal and external outlines, mostly seen elsewhere, which do not support themselves, and within which the engineer must force an iron structure with toil and of necessity, which lends the necessary stability to the sham form.

i. Development of the Western End of the Church; towers.

123. Diversity in Development.

We now come to the development of the western end of the church.

The ground plan of this portion can scarcely be treated by itself without the elevation. Therefore we will consider both together.

Two different modes of treatment may in general be distinguished:-- that without towers and that with one or more towers.

The treatment of the western elevation without the aid of towers is unfortunate in nearly all styles. There is scarcely a more unlucky outline for a front elevation than that of a basilica. The roofs of the side aisles spoil the whole view. Early Christian art meanwhile extended the side aisles across the western facade, and thus the appearance was transformed into something more supportable. But its front elevations are generally extremely ugly. Romanesque art was unable to improve this mode of treatment.

124. Monastery Church at Maulbronn.

The Cistercian Monastery of Maulbronn in Wurtemberg (Figs. 223 - 231 ⁹³) was founded at that place in 1146 and its church was consecrated in 1173. It exhibits the pure Romanesque style of southwest Germany of that time; evidence against the opinion, that the Cistercian order had a peculiar style and its own architects. In the Romanesque period, its churches with scarcely an exception follow those of the vicinity. Thus in the east, Marienthal near Helmstadt.

Note 93. After Paulus.

The Church was not vaulted, and as truly German, it possessed only wooden ceilings. In the early Gothic period, the choir was vaulted and only in 1424 did it receive well designed late Gothic vaults in the clearstory. How thin were the clearstory walls favored at that time is shown by the cross section (Fig. 229). The church is a cross-shaped pier basilica, whose basilican design plainly appears on the western facade (Fig. 228). The architect loved very heavy cornices. Such are likewise shown by the rood screen, which was added within this Romanesque period of the building of the entire church, and also the portion of the monastery buildings adjoining on the north of it.

Before this western facade was later built an early Gothic vestibule of the most charming details (about 1200-1210), together with the aisle of the cloister along the church and the

refectory of the monks. These parts of the buildings cannot be studied sufficiently. Their origin is due to the architect with the two half moons, who likewise built the Chapel S. Michael and perhaps the choir and transepts at Ebrach, also Walkenried and the Bishop's passage with choir and transverse aisle for the Cathedral at Magdeburg. All these structures exhibit the entirely similar details, as well as two half moons on a certain kind of corbels.

162
166 125. Other Basilican Designs.

169
170 An entirely similar western facade is shown by the Church S. Johann at Schwäbisch-Gmund (Fig. 232⁹⁴). The tower, that here appears in the drawing, stands against the choir in the rear. It received its upper stories in the early Gothic period about 1220. The entire remainder of the church originated at the same time as Maulbronn (about 1180). Why the main tower was so carelessly displaced from the middle cannot be solved.

Note 94. From Jahresheft des Württembergischen Aertug-Vereins.

To these two Romanesque churches is added the Church of the former Cistercian Monastery Ottenburg in the Palatinate (figs. 233, 234⁹⁵), executed both massively and splendidly in the transition style. It likewise exhibits the basilican cross section on its western facade, and this is no more beautiful than those of its Romanesque sisters.

Note 95. After Moller.

Aside from the date of the foundation of the settlement in 1145, no statements have been preserved; but the building itself tells its own story. The entire church is vaulted with cross vaults on ribs, and it is accordingly furnished from below upwards with massive piers and walls; yet all capitals in the nave are already French volute capitals.

The choir is the oldest portion. It originated a few years before 1200, the nave afterward in 1200 - 1220, and the western facade with the adjoining bays about 1240. The longer sides clearly show the transition style; they still have purely Romanesque round arched windows with round arched frieze. But these windows are coupled -- on account of the vaults -- and are more elongated, than is the Romanesque custom. On the contrary, the interior is entirely in the true earliest Gothic.

The later Gothic found a better solution at the ends of the transverse aisle. It did not bring the roofs of the side aisles forward to appear on the facade; they are hipped, and the rain gutter next the cornice terminates horizontally the side aisles. The best known examples are the transepts of Cologne Cathedral.

126. Italian Western Facades.

The Renaissance was not much more fortunate later with the colossal volutes at those places. The basilican cross section remains a part not to be visible in the artistic treatment.

The Italians of the Romanesque period therefore usually erected a solid wall, that entirely concealed the basilican cross section. But since this was crowned by a single great gable, it produces the impression, that behind this western facade exists a church with a great single roof.

This kind of solution is therefore a sham, a deceptive sham, and thus it represents those Italians, who employed Romanesque art and at first Gothic indeed in an exceptionally unskilful way. Likewise the Italians during these centuries were not at all the giants in art, as they appear to us in the Renaissance. The architecture is almost entirely mediocre and likewise the sculpture, and since one cannot assume, that the race only produced blockheads before 1400 in order to bring forth geniuses after 1400, it must be the only correct explanation, that the Renaissance sprung from its innate nature and was suited to all its capacities, and on the contrary, that Romanesque and Gothic art did not owe their existence to it, and were just as little adapted to their feeling, thinking and invention, as to their capacities.

Likewise these Italian western facades do not once show an attempt at a reasonable solution. They pile rows of little columns with round arches above each other, which as at the Cathedral of Pisa are gradually and helplessly depressed beneath the roofs of the side aisles. All is splendor, sham and entire inability to exhibit externally what the church presents internally. Truly Italian.

The Cathedral at Pisa (figs. 235 - 238 ⁹⁶) was indeed begun in 1063, according to an inscription; but as it stands before us today, it can only date from the middle of the succeeding

century. The cathedral is a 5-aisled basilica, which has a wooden ceiling in the middle aisle and also galleries. The columns came from antique structures, since they nearly all differ in height and diameter. The columns were collected and erected by an architect Busketus. Thus states an inscription on the western facade, where is also found his tombstone. The entire architecture does not differ much from that of the leaning tower and of the baptistery church. But the dates of the origin of both the latter are known. The baptistery was founded in 1153 and the leaning tower in 1174. It is therefore entirely impossible for the cathedral to have originated a century earlier; particularly since the ornamentation of the external facades by large columns connected by round arches, within which appear inlaid alternately circles and diagonal squares, only belongs in all Italy to the 12th century. Thus the similarly treated Cathedrals of Ferrara (1185) and of Modena (1184), as well as the almost similarly designed Church S. Micchele at Lucca.

Note 96. After De Darteln.

S. Ambrogio at Milan (Figs. 239 - 243 ⁹⁸) is of great interest in every way, since the most diverse views prevail concerning the age and origin of this church. Some hold the church to be a Lombard work of the time of Archbishop Angilbert, whose golden facing of the high altar, the Pala d'Oro, is still preserved; others believe that ^{it} belongs to a peculiar Lombard style after the year 1100, which invented the rib vaults and served as a model for the Norman buildings. Both are erroneous.

Note 97. After De Darteln.

Note 98. After De Darteln.

If one wanders through the interior, then the middle aisle is seen to be covered by early French cross vaults on ribs, which are foreseen below. This places the entire church in a different light. Its date and its school are freed from all uncertainty. It is the early French transition style in an Italian dress. Its date of origin may be assumed about 1150 and later. Therefore it cannot be the mother of the Norman buildings. The Romanesque structures of Normandy are chiefly those with wooden ceilings, which were afterwards furnished with early Gothic vaults, as in Germany. Thus especially the two churches of Wil-

William the Conqueror and his wife Matilda; S. Stephen and Holy Trinity at Caen; these originated in 1070 and were only vaulted a century later. Not much opposes this view, if the two original churches had to give place to new Romanesque structures after 1100. In any case, they only received their vaults afterwards, and these vaults date from the time about 1170 - 1200.

If, as in its true imitation S. Michele at Pavia (Figs. 244 - 247⁹⁸), the vaults in S. Ambrogio itself were only added after its erection, then they never served as models for Norman buildings. The Norman structures had the inventors of these vaults as direct neighbors in Ile-de-France. If men differ in reference to whether the vaults were contemporary at S. Ambrogio, every doubt seems to be excluded at S. Michele. Its clearstory vaults were constructed at the same time as the entire building.

Note 98. From De Dartein.

In both churches the vaults of the middle aisle are stiffened by those of the side aisles. The vaults of the galleries are so high in S. Ambrogio, that the same slope of the roof covers the vaults of both the middle and side aisles. Here the western facade, which shows a single great gable, is therefore correctly treated. This is no longer the case for S. Michele; the galleries are lower; the facade with its single gable does not correspond to the roof behind it. For this reason, S. Michele must be later than S. Ambrogio.

As in all Italian churches, the windows are so small, that they would be entirely insufficient for northern conditions. While larger windows might be readily arranged in the side aisles and galleries, this is forbidden in the clearstory by its small height. Therefore on account of the better lighting by large windows, the middle aisles of basilicas in our country are carried higher.

Other developments of the western facade have also been frequently attempted. The Monastery Church at Chorin (Figs. 248 - 250), one of the most beautiful early Gothic brick structures in the Mark, conceals the side aisles by a smaller repetition of the principal gable. In this manner the bad basilican cross section is made inoffensive; but this western facade is likewise more or less a sham. The Monastery was founded at that place in 1273; the Church dates from that time. It must have

been rapidly erected in its eastern parts, since the tracery still exhibits beautiful early Gothic. The latter is still carved in large pieces after the manner of cut stone and then burned, not being composed of separate bricks.

127. Hall Churches.

The western facade of a hall church is exhibited by the Church Frauenkirche at Nuremberg (Fig. 251⁹⁹). It is indeed executed in the puerile workmanship of that time, but on the whole it presents a structure with picturesque effect.

Note 99. After Essenwein's drawing.

128. Towers.

While the Italians helplessly placed the tower beside their churches, other peoples combined it in an entirety with the church buildings to which it belongs, and thus the awkward basilican cross section was likewise purposely concealed, but no sham architecture was created, and no opportunity was afforded for any erroneous conclusions.

The oldest existing example of a tower on this side of the Alps must be those of the Minster at Aix-la-Chapelle. A great square tower in the middle to receive the bells, with two adjacent small round staircase towers to accompany it on the right and left.

This very ancient scheme was continued through all the centuries. The Church S. Johann in Liege exhibits a not much later example of this tower design. In the Church Liebfrauen at Maestricht (Fig. 252¹⁰⁰), such a tower has been almost completely preserved from the early Romanesque period. Likewise the towers of S. Maria-im-Capitol at Cologne and of Brauweiler near Cologne (Fig. 253¹⁰¹) are based on this model, even if their little adjoining towers are also square and are set back further. At Brauweiler their upper parts stand free beside the principal tower -- a grand view!

Note 100. From Dehio & von Bezold.

Note 101. After Bock.

199
198 The variations of this scheme may be traced far. Even on the western end of Worms Cathedral (Fig. 254¹⁰²) and on the Cathedral at Erfurt this triple division of the tower experienced further development. The side towers were stunted in Westphalia; the principal tower alone develops into a crude and mighty

size, as on the Cathedrals at Münster and Paderborn, and on S. Patroclus at Soest.

Note 102. From Dohme, R. Geschichte der Deutschen Kunst. I. Die Baukunst. Berlin. 1887 - 1890.

Likewise in eastern Germany has a strong scion of this form of tower been transplanted to Magdeburg. The Church Liebfrauen there exhibits the form of the tower at Aix-la-Chapelle in the most archaic treatment. But new forms appear there; the side towers overtop the main tower with their spires; the latter becomes a great belfry, that connects the two towers and is covered by a high gable roof. Thus are treated the towers of the churches at Gernrode, Gandersheim, Halberstadt, Goslar and Brunswick.

In the Gothic period this belfry received a colossal tracery window, as chiefly at Brunswick; the Cathedral, S. Egidius and the Church S. Martin. The accompanying towers become in Magdeburg still more stately and independent, and the venerable Cathedral overtops everything with its pair of colossal towers. Even in Strasburg on Erwin's Minster appears a sprout of this Saxon art in the much criticized story above the rose window.

179 Likewise in the Mark are further developed the Saxon pair of towers with the connecting belfry. The Cathedral at Stendal and the Monastery Church at Jerichow (see the adjacent plate) exhibit the rather tasteless forms of Magdeburg art. The bad spire with the hateful covering of slate is not mediaeval. Jerichow Church was already in use in 1159, as appears from a bull of Adrian to the prefect Isfried of the Church of Jerichow. The Premonstrant foundation was by the Cathedral provost Hartwig, later Archbishop of Bremen, and his mother in 1144, near the Parish Church and beside the Citadel of Jerichow. After a few years however, it received besides from two brothers, Heinrich and Rudolph of Jerichow, the ground and site on which the Church now stands. The uppermost story of the tower dates from a later time. Otherwise the old Romanesque church of about 1150 has been almost entirely preserved, and it affords a good example of the Romanesque brick art of that time.

The City Parish Church at Jerichow and the Monastery Church are the earliest brick churches, whose dates can be fixed. The Parish Church was already standing in 1144, and it is still well

preserved. Both churches have wooden ceilings.

129. Tower Houses.

In the little village churches of the Mark occurs a second allied motive of this tower, the tower house. Across before the nave and with the width of the middle aisle lies a rectangular tower, which is generally covered by a gable roof with two side gables.

In the Romanesque period the more important cathedrals already exhibited similar tower houses; thus the Cathedral at Hildesheim, the Cathedral at Minden, the Cathedral at Havelberg (Fig. 255 ¹⁰²) etc.

Note 102. From Adler.

These tower houses were so divided into three parts, that the portion before the clearstory was made higher.

¹⁸⁰
¹⁸¹
¹⁸² The transverse tower houses are practical in every way. They have a massive appearance in the front facade; much material is then saved in the side facade, and, if the bell swings lengthwise the tower, this economy has no bad results. If the small gable roof of the tower receives a roof turret, then a very happy and very cheap solution is found, which even has a state-ly effect at a distance.

130. Towers with Buttresses.

While during the Romanesque period the simple rectangular tower before the western end of the church was not much favored except in Westphalia, it was strongly adopted in the Gothic, indeed especially with its artistic beauty increased by the buttresses, which subdivide it from bottom upwards. In the early Gothic period, these were set at right angles in pairs at an angle of the tower, as shown by the towers on the western facade of the Cathedral of Beaune (Fig. 206 ¹⁰⁴). During the high and late Gothic periods, they were set diagonally, then to again entirely disappear in late Gothic times. Instead of them the late Gothic rectangular towers received rich spires.

Note 103. From Adler.

Note 104. From Archives de la Commission etc.

¹⁸³ 131. Oblique Lozenge Roofs.

The Romanesque square towers on the Rhine have on each of their four sides a gable, above this being a low oblique lozenge roof. Thus the tower over the western crossing of the

Abbey Church at Laach, illustrated in Fig. 133.

132. Massive Tower Roofs.

The French Romanesque towers commonly exhibit massive stone roofs. The thickness of such spires is relatively small; even for tall spires as at Chartres, this at most amounts to 15.75 inches at bottom and 7.87 inches at top. The Abbey Church of Brantome (Figs. 257, 258 ¹⁰⁵) affords a representation of these French towers, still constructed somewhat capriciously in the beginning of the 11 th century. Their appearance later changed into a more orderly and suitable regularity. The tower of the Church at Nesle (Fig. 259 ¹⁰⁵) is a correct representation of a French tower of the transition period before 1150, when in the interior of the church the Gothic transformation was already completed, and while on the exterior Romanesque forms were first drawn, before new ones were brought forth.

Note 10. . After Viollet-le-Duc.

133. Diversity of Tower Roofs.

When Romanesque towers are octagonal, they then have eight small gables and a corresponding spire with eight sides, or a valley spire of sixteen sides.

These spires extend to great heights in the Gothic period, particularly on the border of the Baltic sea, there remain the strong square towers with four tall gables and a massive octagonal spire, but which does not show a regular octagon in plan. Thus the churches in Lübeck and Stralsund.

To the democrats of the end of the 18 th century, towers were a very particular abomination, since they destroyed "uniformity".
 184 Hence they were torn down whenever possible. Even the Strasburg tower was already devoted to destruction. But since its removal presented dangers, they were finally satisfied with placing on it a great red striped liberty cap of tin. Fig. 260 shows how the Chapel of the Reliquary of the Holy Taper was torn down in Arras. It is well known, that in Rheims one of the most beautiful churches of the world, S. Nicaise, suffered the same fate. Under the lead of a gigantic brewer was formed a great band, that pursued the work of destroying churches. They undermined one of the internal piers, forced wood under it, placed a pile of rubbish around it, which was set on fire; the pier gave way and the whole afterwards fell.

184. Terminations of Buttresses.

The buttresses of the towers end at top in pinnacles of the most varied forms, which serve as small spires to accompany the great spire. They have been so pleasing, that even if no buttresses strengthen the tower, these small angle turrets are retained and are corbelled out diagonally. Between them extends a balustrade or a gallery, and thus originated the very picturesque tower roofs, like those shown by the Teyn Church at Prague, S. Gangolf at Treves, and similar structures.

185. Tower of the Minster at Freiberg-in-Breisgau.

The most beautiful and stately single tower is indeed the tower of the Minster at Freiberg-i-B. (See the adjacent plate and Fig. 261 106). The base in early Gothic style is square with pairs of buttresses at the angles and ends with a great gallery at the height of the church roof. On this stands a richly traceried tower body, executed by the hand of a second architect. The tower then apparently becomes octagonal and is accompanied by four richly designed pinnacles, for which an equilateral triangle serves as a plan. Only high above do the pinnacles separate from the main structure, which must then support itself.

Note 106. After Dohme.

It is astonishing, how these masters dominated their art. Who would venture today to pile these masses of stone, perforated like lacework, up to the clouds, were we in the position of the middle ages, to which earlier races had left nothing of the kind. The most accurate computation of the weight of those masses of stone and the knowledge of what load should be entrusted to each square inch of the stone, can alone have made possible such works of art.

With the tower at Freiberg competes that at Ulm (see the adjacent plate and Fig. 262 ¹⁰⁷). It indeed came to us unfinished and it originated at a later time; but in colossal size and boldness it is nowise inferior to the Freiberg tower, even if it lacks the perfected and completed form of its rival. In any case, no other country can place their equals beside these towers. Most nearly does the single completed tower of Antwerp Cathedral come into consideration (Fig. 263), and this likewise stands on German soil.

Note 107. After Beyer's drawing.

The plan of Ulm Cathedral (Fig. 262) stands entirely outside every system. The Minster is a parish church and was so built; but it is for the most part a work of magnificence and not for use; it was to express the power and pride of the citizens of Ulm and therefore to excel all neighboring churches, even that of the Bishop. And it indeed succeeded in this. The parish clergy must furthermore have also led a "regulated" life as foundation and cathedral dignitaries; for the choir is elongated and furnished with a rich series of choir stalls, carved by Jörg Syrlin.

This Minster is a 5-aisled basilica with a colossal western tower before the clearstory and two eastern towers beside the choir. The corner stone was laid in 1377 with great ceremony. From 1390 to 1480, the Ensinger family of architects carried on the building. The vaults of the middle aisle were completed in 1471, and those of the side aisles in 1478. From 1474 onward, Matthäus Böblinger came from Esslingen, who was to complete the tower. But since the latter commenced to sink, Böblinger took to flight. Thus the stump of the tower was left until our times, when it has been completed. Cathedral architect Beyer was in charge. The ancient elevation of this tower had also been preserved, and it was finished accordingly.

The tower appears in its doubled architecture, since in particularly before its walls or windows is carried up a separate mullion and tracery architecture, that covers the whole like a lace veil, as a successor to Erwin's western facade of the Strasburg Minster.

The perforated spire of the Church Frauenkirche at Esslingen (Fig. 264 108) is characterized by classical perfection. The church itself was erected after 1406 by the famous Ulrich of Ensingen; the spire of the tower was by Hans Böblinger (1440 - 82). Worthy of note is the somewhat rigid consistency with which the necessary winding stairs were placed in the front facade as a chief requirement and was extended higher at one side.

Note 108. From Heideloff, C. Die Bauhütte des Mittelalters in Deutschland etc. Nuremberg. 1844.

Whoever returns from Italy over the Brunner pass cannot avoid the homelike impression, which the view of the first high church roof and of the first German church tower arouses (at Bozen).

The Bozen Parish Church (Fig. 265 ¹⁰⁹) indeed owes its tower and choir to a German hand, since the people are likewise German. Hans Lutz of Schaffenried undertook this rebuilding in 1501-1519, the same architect that erected the nave of the City Parish Church at Sterzing between 1497 and 1525. The nucleus of the church is an early Gothic hall church, which is so similar in its details to those of Trient Cathedral, that one would not err if one also assumes for the Bozen parish church Adam of Arognio with his successors, who from 1212 onward built the Trient Cathedral, under Bishop Count von Wangen. Arognio lies in that part of the shore region about Como, which after Otto the Great had always belonged to the German empire, and which already in the 8th century was subject to the Frankish king Theodebert. Its people for a thousand years supplied the neighboring countries with architects, sculptors, painters and artisans. So far as these Comacine masters came from parts of the German empire, they proudly called themselves "Tedeschi." (Germans). Thus have we seen for Jacopo Tedesco, the architect of S. Francesco at Assisi (see A.t. 119); such an architect was also Adam of Arognio. Each artist for the most part impressed his stamp on the architecture of upper Italy in the Romanesque, as well as in the early Gothic period. If the art of these Tedeschi has no special German character, and thus likewise the nave of the Bozen parish church, yet the choir and the tower of the latter exhibit the pure German impression.

Note 109. From Wiener Bauhütte etc.

¹²¹
¹²² The Cemetery Chapel of Avioth on the Maas (Fig. 266 ¹¹⁰) from the 15th century is here included, since it is developed like a tower and affords a charming model of a late Gothic perforated spire.

Note 110. After Viollet-le-Duc.

136. Development with Two Towers.

¹²³ Northern French art preferred rather two towers, which allowed the middle aisle to pass between them. Therefore this came into use in the development of the western facade, and the two towers only conceal the side aisles. Apparently Normandy under William the Conqueror first (after 1061) employed this style of western facade on a large scale in the two churches of Abbaye-aux-Dames and of Abbaye-aux-Hommes.

For the northern French cathedrals was soon developed a fixed arrangement. A lower story contained three doorways, which opened into the middle aisle and the two side aisles. The next story above exhibits a great rose window in the centre -- a wheel window that lights the middle aisle -- on the right and left being a story of the tower, whose windows correspond to the clearstory windows. Between the two stories and at the height of the roofs of the side aisles extends an arcade of small columns. In the third story projects the gable of the great roof at the centre, usually partly concealed likewise by an arcade, accompanied on the right and left by the stories of the towers for the bells; then above these rise the spires.

These towers, with scarcely an exception, are finished with pairs of buttresses at the angles, terminating in pinnacles. The commencement of this is shown by S. Denis near Paris.

194 Notre Dame at Paris has the first fully developed western facade (see the adjacent plate as well as Figs. 267, 268 ¹¹¹). The date of its origin, like that of its western facade, is fully proved. The Bishop of Paris, Maurice de Sully, united in 1160 the two adjacent churches of S. Maria and S. Stephen, and he laid in 1163 the corner stone for a single structure. The high altar was consecrated in 1182. When the Bishop died in 1196, he bequeathed 5000 pounds of silver for covering the choir with lead. Then the choir was complete, and the nave had probably risen above the level of the ground. In 1223, the western facade had grown to the upper great gallery, and the cathedral was as far completed in 1230, as we see it today. It exhibits on the whole the subdivision, which nearly all cathedral facades retained; three divisions in a vertical as well as in a horizontal direction; the towers with their buttresses stand before the side aisles, each one being here before two side aisles, since Notre Dame is 5-aisled. Three colossal doorways lead into the interior. The lower story terminates at the height of the side aisles in a gallery with statues. Whether these are the kings of the Franks or those of Judah, the ancestors of Christ, is doubtful. The number is against the latter opinion. In the Holy Scriptures are mentioned only 15 or perhaps 18.

Note 111. From Dehio & von Bezold.

The second story at the height of the clearstory windows exhi-

exhibits a boldly executed rose window 31.5 ft. in clear diameter, with arched windows on its right and left. The small blind rose within the pointed arch covering there is usually found again in Germany, as on the Freiberg transverse aisle.

The third story is composed of a high and airy gallery of columns at the height of the clearstory roof, through which the gable of the roof is merely visible; above this then rise the bell stories of the towers. Whether a further intermediate story was intended, as drawn by Viollet-le-Duc, appears very uncertain, as the doorways seem so entirely depressed into the earth. The spires should have commenced directly above this bell story; out they were never built. The balustrades of the passage above the high gallery of columns are crowned by fanciful animals, that exhibit great creative power. In the background between the two towers may be seen the tall roof tower erected by Viollet-le-Duc. It is of wood covered with metal.

The western facade of Laon (Fig. 269 ¹¹²) is perhaps of the same age as that at Paris, but it has not matured into that almost schematic clearness. But it therefore seizes upon the observer in a far nigher degree than that of Notre Dame at Paris. The geometrical drawing cannot render in the slightest the colossal and picturesque character of these masses. The transition from the square substructures of the towers with their buttresses into the octagonal stories has become a model for many towers. Thus as already stated in Art. 15, the western towers of the Cathedral at Bamberg and also those of Naumburg Cathedral are based upon them.

Note 112. From Bulletin Archaeologiques. 1894. p. 2 et seq.

The little upper corner turrets on one of the western towers at Bamberg, shown on the adjacent plate, are additions by Essenwein. These towers were probably completed at the consecration in 1237.

The Cathedral of Rheims (see the second plate adjacent) exhibits this arrangement of the western facade in the richest treatment conceivable -- a fairy tale in stone. It dates from the second half of the 13th century. Its architects were Jean of Orbais, Jean the Wolf, Gaucher of Rheims, and Bernard of Soissons; for in the labyrinth formerly existing in the pavement of the church, there were placed in the four corners the portraits of the architects with the following inscriptions:--

"This portrait is in memory of Master Jean of Orbais, who was

the master of this church and began its covering."

"Gaucher of Rheims, who was master of this church for seven (eight) years and worked on the vaults and portals."

"This portrait is in memory of Master Bernard of Soissons, who was master of this church --- built five vaults and worked on the western facade, master of its works for the space of 35 years."⁶⁹

Yet even the western facade of Rheims was still surpassed. This is shown by Erwin's Strasburg Minster (see plate opposite page 198).
197 Erwin added to the extremely rich sculptured ornamentation at Rheims a colossal lacework veil of the most graceful tracery, which is spun over the entire western facade. This lace veil was executed only over the lower story and about the rose window. In the spaces beside the rose window were still retained merely the principal mullions; the ornamental tracery bars were omitted. A change in architects evidently occurred between these parts.

On S. Urban's day (Feb. 25 ?) in 1277 was laid the corner stone of this western facade:-- "In the year of our Lord 1227 and on the day of S. Urban, this glorious work was begun by master Erwin of Steinbach," existed formerly on the "Porta Sertorum." (Portal). The Minster burned down on Aug. 15, 1298. Erwin died in 1313.

Manifestly by its form, the western facade was commenced, so that those parts were first completed, which closed the side aisles and clearstory. Then were first erected the walls of the towers beside the rose window. This probably still occurred under Erwin or after his drawings, since their buttresses exhibit the gracefully arranged tracery of the lower story. A new architect is then found, who evidently was compelled to economize. To him belongs the free tracery before these stories of the towers, as well as before the equestrian statues. There terminates in general the lacework veil. It should however extend in the uppermost story of the tower and there perhaps end in gables. This is shown by the corbels high up beside the tower buttresses beside the points of the pinnacles of the second equestrian statue. This is before all shown by the plan of the tower itself.

While the same otherwise appears entirely fanciful, it wins in sense and understanding, when one extends the lacework veil between the two front buttresses. This is indeed the grandest view, that the human imagination can conceive, if one imagines its lace veil to extend up to the top. Moreover it is evident that the

simplified lace veil should likewise be extended over the story above the rose window, so that the dry windows might be regarded as concealed in the background. This is proved by the likewise existing corbels above between these windows.

The Cathedral in Cologne has so far experienced a change of the usual arrangement, that its five aisles are also exposed on the external facade. The towers are subdivided by a pier at the middle, thus showing that two side aisles lie behind each.

178 This division of the towers at the middle is indeed already exhibited by the Cathedral of Chartres, yet without having double side aisles behind them. Likewise are treated the towers of the Cathedral at Limburg-on-Lahn (consecrated 1285).

As a conclusion to this development of the western facade with two towers may be given the most compact and simplified solution, that is well conceivable, the charming western facade of the small village Church at Lugan near Dobrilugk in the province of Saxony. (Fig. 270 ¹¹³). On a granite substructure are built two twin towers of brick. The effect of the whole is most happy.

137. Italian Towers.

As previously stated in Art. 128, Italian towers chiefly stand detached without connection with the church as a whole. The best known of these towers is that of Florence Cathedral by Giotto (about 1332 - 1336). Were not Giotto a great painter, this tower with its very ungraceful and dry outlines would make him no great artist.

The earlier Romanesque towers of Italian art show a great number of stories above each other, that exhibit upwards an increasing number of round arched window openings. We find similar telescoped towers on the choir of S. Gereon in Cologne; but they are still more artistically treated than are most of their Italian relatives.

These Italian towers are frequently round, especially those of the earliest Romanesque period. The plan of S. Gall (see plate next page 85) also shows two round towers, placed detached from the church in Italian style.

Note 113. From Adler.

The leaning tower in Pisa is one of the latest and richest examples of this kind. Its architects were Wilhelm of Innsbruck and Bonannus. The corner stone was laid in 1174.

138. Form of Spire.

Here may be added some remarks on the forms of spires.

When in modern times old towers are furnished with new roofs or new spires, they certainly are displeasing. They also look quite fiddlerently from the graceful and charming creations of the middle ages. Wherein does this indeed lie? Chiefly in the false slate roofing and in the ugly projections. The latter are much exaggerated and permit the spire to intersect them without transition. The late middle ages indeed likewise employed such projections; but then an elegantly rounded off cavetto passes into the spire of the tower, which is slated. Furthermore the intersection of two surfaces always occurs by means of a rounded cavetto, which is slated. The converse may also be stated; since all cavettos are covered with slates, they must be sheathed with boards, since they could not be slated otherwise, and recourse must then be had to metal cavettos. The metal cavettos however completely separate the general impression of spires and roofs and detach the different surfaces from each other in the hardest and most displeasing manner. These unattractive spires disfigure our churches from Treves to Stendal and beyond; Hildesheim is especially so distinguished.

If the elevation be already bad, then the undirected or misdirected slate covering carries the mistreatment to the unbearable. Instead of using our beautiful German slates, which the fatherland supplies in the best choice on the Moselle, in the Eifel, on the Rhine, in Thuringia as in Hanover, the slates must be brought from a foreign country -- England --, and the money passes over the border to never be seen again. Now the English slates indeed are in beautiful large pieces; but the relative dimensions of these slates destroy the scale of the towers, as they have a very displeasing effect on the steep church roofs.

If the English slates have been retained by chance, then men falsely cover the German slates. It has a peculiarly unpleasant effect, for each roof surface to be bordered by a slate course. The unity of expression is entirely destroyed, without substituting for it any greater durability. Such lives only in the imagination of the badly trained slate roofer. Particularly on the Rhine and on the Moselle is it conceivable, whether the tower spire should be anchored to the masonry beneath it, men were al-

clearly decided in the middle ages. The wooden spires were anchored by wooden ties extending inside next the masonry of the tower down to a layer of beams, above which was sufficient masonry, so that the spire could not overturn, i.e., vibrate. Usually the bell frame is also built in this wooden story as a load. This is shown by the Tower of Haselbach on the adjacent plate. The construction of the spire is as follows. Inside are built two vertical cylindrical framework structures, not compressed into octagonal form, like the spire, while they are stiffened at top and bottom by crossed braces; in the same manner are the angle ties braced inside and below. Upon these two strong frameworks above each other rest the rafters. Further up, where the rafters alone extend, they are likewise stiffened by struts from the upper end of the octagonal structure. Finally they are connected together by horizontal girts resting on corbels. Also to receive the cross and the cock, a king-post is inserted in a series of girts. A king-post extending from the bottom to top was very common elsewhere, but not in this mediaeval spire.

Chapter 7. Mediaeval Architectural Drawings.

140. Necessity of Drawings.

How were architectural drawings made in the middle ages? The writers on art assert, that men could scarcely draw in the early middle ages, at most in the late period, and in any case neither so much nor so well as today. If one therewith emphasizes merely the differences produced by the invention and cheapening of paper, pencils, drawing pens and water colors, then would the writers be in the right. Yet it is not so. They actually believe that the buildings originated without drawings.

To every architect, who has not lost judgement of possibilities, it is still clear, that everything must have been drawn, as today. Whether on cowhides, sewn together, on parchment, on wood, on stone slabs and other surfaces is immaterial; drawings must have been made. For choice or on account of mere limitations, architects likewise today do not prepare numerous drawings. Or if it was a "trade secret", whose ghost appears in all art histories, then must architects still place themselves behind it in order to recover this "secret" again. What time, toil and cost would they save themselves!

Yet with this is combined as usual the ignorance of architecture with that of the mediaeval archives. Such drawings have been preserved, also statements concerning drawings, and finally representations of how architects drew and handled drawing tools.

141. Ground Plan of S. Gall.

The oldest design is the ground plan of the Monastery of S. Gall, which is represented on the plate next page 85; the same is drawn in simple red lines on three cowhides sewn together with approximate dimensions of 3.28 x 3.28 ft. It is not an architectural drawing but a general sketch, sent by an unknown person of high station to "his son Gozbert." Yet everything is correctly laid down at scale, even if some of the dimensions inscribed in the church do not fit. The walls are only given by single lines, therefore are not intended for execution. The distances between the different buildings are very much reduced to save space. It is interesting to see how in certain places, for example in the cloister, the revolved elevation is there drawn to make it clearer.

Furthermore all indications of the plans of houses on the S. Gall plan are incorrect, which regard the interior as a court or

atrium, from which the rooms were accessible. All considerations connected therewith, that this plan came from the South or even from the East, or that the civilization there "yet" did not offer or demand more protection from injuries by the weather, spring from those entirely unproved views of the centuries after the wandering of the nations, which ascribe to them nothing more than fearful barbarism and want of civilization. The lack of culture lies only in the ignorance of the documents and evidences of that time. The greater the ignorance in the modern period, the darker are the middle ages.

This interior, from which all rooms and apartments are accessible, is the great comfortable hall, separated from the exterior by an anteroom and heated by means of a hearth. This hearth is drawn in each of these halls as a rectangle and is even designated as "place of the hearth" in the House of Strangers. Men were inclined to regard this hearth as a "little house in the garden." Over the hearth perhaps hung a great smoke hood; therefore the word "testudo" (shield) is indeed once inscribed.

How the lighting of this interior occurred cannot be seen from the plan; but it indeed resulted from a high side light, for the outer walls extended high above the side roofs and were furnished with windows. Such small houses are frequently seen in miniatures and carvings.

142. Miniatures.

That men could draw is also shown by the numerous and largely executed miniatures of those times. Moreover the miniatures have contributed to especially erroneous views concerning the middle 201
192 ages. The makers of these miniatures were either amateurs or professional miniature painters. That by the hands of amateurs nearly everything was quite distorted and drawn is clear, and that in general the professional miniature painters were not the artists in painting, but were merely creating artisans, who worked after spiritless patterns, expressed every movement of the body or emotion of the soul by extravagant and affected poses, is likewise self-evident. So it also is today. Let us consider the pictures of saints in the churches. And thus we see in the mediaeval miniatures almost exclusively an amateurish and inadequate, mechanically distorted picture of the period.

That this is the case is shown by the sculptures on the minst-

minsters of the 13th century, which present nothing of the unskillfulness and affectation of the miniatures. This appears from the works of architecture itself, whose dignified, secure and refined forms have nothing of the helpless little houses of the miniatures. Most men cannot free themselves from the impression made on them by the miniatures. This remains to them the middle ages.

143. Architectural Drawings.

Now for the architectural drawings. The drawing of the monk Hadwin of his monastery of Canterbury (about 1150¹¹⁴) is indeed likewise no architectural drawing; but it shows us that men drew everything, even the existing water supply pipes.

Note 114. See Trans. Roy. Inst. Brit. Architects. 1887.

There has been preserved in Rheims the elevation of the transept of a cathedral from the beginning of the 13th century.¹¹⁵ It was later used for writing upon; this fortunate accident preserved it. For that only peculiar accidents preserved drawings will be at once clear to every architect, if he considers what remains of his own architectural drawings for buildings, which date back only 10 to 20 years. Almost nothing. Then be silent concerning past races and especially in regard to such, that were almost a thousand years since, and who naturally drew on paper much less than we do.

Note 115. See Annales Archæologiques. 1846.

144. Sketch Book of Wilars de Honecourt.

From the time about 1244 has been preserved a sketch book of a French architect, Wilars de Honecourt.¹¹⁶ It may be quite accurately placed in date, since Wilars sketched the Cathedral of Rheims, when it had not yet received its vaults, but had in part already been carried up. Even the chapels were not yet vaulted.

Note 116. See Willis, R. Facsimile of the Sketch Book of Wilars de Honecourt. London. 1859.

Wilars drew everything possible. In buildings is found first of all the Cathedral of Rheims (Figs. 271 - 274¹¹⁷). Beneath one of the window traceries he writes:-- "Here is one of the windows of the nave bays of Rheims, as it is between two piers. I was called to Hungary, when I drew it. Therefore I love it much." Wilas further gives a tower of the Cathedral of Laon, the rose window of Lausanne, and again the plans of Meaux and Cambray. He

plainly was the architect of the Cathedral of Cambray (Fig. 102¹¹⁷). He writes: AA "And on that other page may be seen the external sketch of the chapels of the Cathedral of Rheims from the beginning below to the end, as they are. Of the same kind shall be those of Kammrich, if they are built."

Note 117. From the Sketch Book of Wilars de Honecourt.

He further drew the ground plan of a Cistercian church with plainly enclosed choir and noted thereon:-- "This is a rectangular church, which was designed for the order of Citeaux." (See Fig. 102).

Then he drew a cathedral choir with doubled ambulatory (Fig. 281¹¹⁷), that he had designed with a colleague Pierre de Corbie:-- "This is a church with doubled aisle. K. Wilars de Honecourt and Pierre de Corbie designed it."

Wilars likewise drew details of furniture, among which is a rich seat with arms and two nude studies (Figs. 283, 284¹¹⁷). Animals of all kinds and men in all positions. Everything is highly characteristically and skilfully represented. Since he first sketched lightly with a lead point but finished with ink and quill pen, then may every one that draws, realize the particular difficulties of such sketching. The figures frequently have very richly folded garments; they remind one of the engraved figures of shrines, especially of those at Mettlach. Perhaps Wilars frequently drew for such works, or he sketched the figures in question from such caskets (Figs. 277, 283).

He has further noted a great number of auxiliary constructions, for example, how to determine the centre of a column, if only the exterior be given; how a bridge is thrown across a river with timbers 20 ft. long:-- "Thus one builds a bridge over a river more than 20 ft. wide." The "great" Guicherat, as the French archaeologists call him, translates this:-- "Thus one builds a bridge for a stream, of wood 20 ft. long."¹¹⁸ He naturally connects therewith a reflection on the barbarism of the middle ages.

*Note 118. See *Revue Archæologique*. 1849.*

Wilars further indicated how to determine the breadth of a river without crossing it; how to find the height of a tower without measuring it; how to determine the inclination of the side surfaces of the different courses of the spire, etc. One sees that a highly developed mathematical knowledge was at the command of the architects. Not a vestige of an artisan training and mastery of a

trade -- or the architects are also honest mechanics today (Figs. 281, 282).

He also laid down subsidiary lines on a number of animals and men sketched (Figs. 275, 276¹¹⁷). Viollet-le-Duc attempted to solve their meaning.¹¹⁹ But whether they are there to aid in drawing the figures, or to make easier and more accurate the transfer at a larger scale, cannot be divined.

Note 119. See *Viollet-le-Duc*. Vol. 7. p. 72, 73; vol. 8, p. 266 et seq.

145. Cathedral at Cambray and Allied Buildings.

Moreover the Cathedral of Cambray has two rows of windows above each other, like the Church S. Elisabeth at Marburg, and since the daughter Sophie of the sainted landgravine, as wife of the duke Heinrich of Brabant lived in the Netherlands, this Gothic must have found its way from Flanders to Marburg. Certainly the Treves Liebfrauen Church, founded in 1227, was begun in 1235. The choir in Cambray was likewise commenced in 1227. Kind Bela of Hungary, at the time when Wilars de Honecourt was called to Hungary, was a brother of S. Elisabeth. Hungary was devastated in 1242 by the Tartars, and thus Wilars would be called to erect greater structures there (1244). But no vestiges of his activities longer exist in Hungary; for the Church S. Elisabeth at Kaschau, that shows a ground plan like that of S. Yved at Braisne, only originated in the high and late Gothic periods, and the excavations have brought to light a single-aisled church as the original structure, so that nothing of the plan would be earlier than the existing church.

Details at full size have been preserved by a fortunate accident, that has preserved one for a hundred thousand destroyed examples. Wilars also sketched such at a reduced scale.

146. Details at Full Size.

The vaults of the side aisles of the Cathedral of Limoges are leveled up horizontally with great slabs of granite. This layer of slabs was utilized as a great sketching floor for such details.¹²⁰ We there see the ground plan of a pier of the choir, a flying buttress with obliquely rising gallery, various pointed arches, etc. Similar drawings are found in the Cathedrals at Clermont and at Nanbonne.

Note 120. See *Annales Archaeologiques*. 1847.

147. Drawings of Facades.

In Regensburg have been preserved two drawings of western elevations, that however have little in common with the execution. According to Adler,¹²¹ one is 4.15 ft. wide and 8.96 ft. high, the second being 4.76 ft. wide and 14.47 ft. high. The first drawing shows an elevation with two towers, as it was executed; the other presents a solution with one tower, somewhat as by the Ulm Minster. The elevation with two towers exhibits a great rose window between the two towers and must on that ground be referred to the 13th century; yet it cannot be placed more exactly.

Note 121. See Deut. Bauz. 1875. p. 182. -- Unfortunately, these drawings cannot be seen. It is advisable to frame them under the glass, as at Cologne, and make them accessible to visitors. This would also be most necessary for their preservation.

In Strasburg have been preserved twelve drawings of the western elevation and of its spire; these are very well exhibited in the Frauenhaus -- the House of the cathedral architect and his architectural office -- and they are well worthy of study. Still another drawing belonging here is to be found in the Minster at Berne.

All these drawings are pure line drawings without any "indication" by hatching or water coloring. The reduction of the western elevation of Cologne Cathedral given on the adjacent plate clearly exhibits this method of indication. Also on the octagon, the projection of the gable does not occur; these diagonally placed gables are revolved back in the elevation.

Otherwise on mediaeval drawings the continuous jambs are also usually drawn in a kind of perspective. This is especially shown by the preserved architectural sketches of Orvieto.¹²²

Note 122. See Fumi, L. Il Duomo di Orvieto e i suoi restauri. Rome. 1891.

Perspective itself had certainly not been developed yet into correct and fixed rules. According to the statements of Vitruvius, the Romans appear to have been acquainted with perspective. (Scenographie). He writes:-- (See original text).

Likewise in the representation of the artistic activity of the architect, the "naive" middle ages far surpassed by our modern period. Consider the charming reliefs of choir stalls given by Viollet-le-Duc. Does the mason with the leather apron and trowel there personify the activity of the architect, or indeed the rude

hand armed with the hammer, as it expressed the triumph of construction at the Berlin Exhibition of the year 1896?

208 148. Representations of Architects.

The architects are also nearly always represented with dividers and drawing rule. Thus the architect Hugo Libergier of the highly famed Church S. Nicaise at Rheims, that the republicans tore down at the end of the 18th century "in the name of civilization and enlightenment." The tombstone of the architect today stands in the north transept of the Cathedral at Rheims; its inscription runs:-- "Here lies Master Hues Libergius, who began this church in the year of the incarnation 1229, the Thursday of Pentecost, and passed away in the year of the incarnation 1263, on the Saturday after Pentecost. Pray for him."

Likewise the architect of the choir stalls at Poitiers, which Viollet-le-Duc prefixed to his "Entretiens sur l'Architecture", is represented with his dividers, as he uses them while sitting at a drawing table. The architect was also similarly represented in the labyrinth of Rheims Cathedral. Jean le Boup held a drawing rule in his hand, Jean of Orbais the dividers. Bernard of Soissons appeared to strike a circle with the dividers.¹²⁴ Master Humbert at the doorway of the Church at Colmar had drawing board and rule on his knees. Likewise the two architects from the Church of Semur and from a manuscript, which Viollet-le-Duc illustrates in his "Dictionnaire de l'Architecture Francaise", hold dividers and drawing rule.¹²⁵

Note 124. See Bulletin Archaeologique. 1894. p. 20.

Note 125. In Vol. 1. p. 115.

149. Models.

The architects not only prepared drawings but also models, indeed in wax, gypsum, wood, small bricks etc.' this is proved by the statements relating to Italian buildings.

How such models were made at all times in the middle ages is shown by the following statement from the time of Charles the Bald:-- "The work was entrusted to artists highly skilled in such things. By their industry, added to the favored location of the place, the model of the intended structure was constructed. And like a prelude was the size of the future great building represented in each beauty and delicacy in a small quantity of wax, that was worthy of the king of angels and of men, as well as of the

dignity of the place."

Note 128. From *Monumenta Germaniae Historica. Scriptores. Vol. 13. p. 402. Henrici Miracula Sancti Germani Autissiodoruni episcopi. Chap. 15.*

150. Auxiliary Lines.

Have the mediaeval architects employed auxiliary lines in designing their buildings? Certainly.

Two things testify thereto. First, that these auxiliary lines are given by the buildings themselves today and may be inscribed in them; second, that mediaeval quotations and drawings relating to them have been preserved.

These are indeed not magical lines and neither mysterious triangles nor golden numerical ratios, but are very simple and self-evident auxiliary lines. Whatever must uniformly affect all eyes can only be a quite simple procedure, which lends to the buildings an individually effective nature. If a flock of pigeons fly about in the air, one sees a number of points whirl through the air in entire disorder. But if one sees a flock of wild geese coming, then will every one know that they fly in orderly wedge-shaped lines. Every child sees the difference between a disorderly mass of people and a company of soldiers arrayed in rank and file. Every one will notice if one soldier be taller or shorter, is out of order, stands in line, or if one be slightly in front and another somewhat behind. Thus it is naturally with the points on an external elevation or in an interior.

Each angle of a window or doorway forms a fixed point for the eye, just like each capital, base, or any other point otherwise marked. Now such points are chiefly arranged in horizontal and vertical lines. But this is not sufficient, since the eye does not observe all the windows in a story, or pass over all the columns found above each other. Entirely definite direction of the eye is prescribed by the nature of architectural forms. The impression whether a window looks too high or too low is composed of height and width together, i.e., the direction of the diagonals of the window opening, of the window enclosure, or a surface makes known to the eye the general proportions of the window, of a tower, a facade, or a surface of the building divided by mouldings. To these entirely self-impressing oblique lines,--the diagonals of the openings or surfaces,--are added on the

building the inclined chords of the arches. The lines joining the apexes and the springings of the arches likewise strike the eye entirely of themselves as lines of direction.

For example, if now the diagonals of the window openings in stories lying above each other are not parallel, this already has an unpleasing effect. If on the contrary, such main inclined direction lines are made parallel, and the chief points be so arranged, that if the eye extends the diagonals of the windows upward and downward into adjacent bays, it meets with other points making themselves prominent, then will a pleasing repose be produced; it does not have to follow lightning-like zigzag lines.

151. Cathedral at Cologne.

The procedure for the longitudinal section will naturally be the same as for a facade, since on the whole it represents such a one. Let us examine the longitudinal section of Cologne Cathedral on the adjacent plate. One first of all views the upper light windows as a surface and the dark triforium beneath them as likewise a surface. Both surfaces have a lower rectangle and an arch above, two forms, that possess very decided direction lines. The rectangle directly makes apparent its diagonals, and the pointed arch its chords from the springings to the vertex. Therefore if the diagonals be drawn from the base to the capital in the clear openings of both openings -- of the arcade and the clearstory window --, then must these be parallel to each other and the chords of the pointed arches be likewise parallel, if the eye is not to be led into any zigzags. Thus is actually designed the longitudinal section of Cologne.

Next the thickness of the pier and the height of the base and capital is taken into account in just as self-evident, refined and effective a manner. Bases, capitals and ribs are not points, but they have dimensions, as well as the piers. If the diagonals in the clear between base and capital be taken as lines of direction, then the chords of the pointed arches of the adjacent arcade cannot lie on the same inclined lines, but they must be transferred by the width of the pier. To this division then corresponds the height of the base. On this transferred parallel at the same time lies the diagonal of the next clearstory window.

These chords further give in the triforium the diagonal of one of the four small arcades, while the first determines the height

of the triforium. For the diagonal of the half triforium impresses itself on the eye, and not that of the whole, since the half triforium is strongly enclosed by the intersecting middle column. This diagonal of the half triforium likewise fixes the capital of the upper vault, etc. Likewise the statues with their corbels and canopies are accurately limited and fixed by these main diagonals. One is always in doubt concerning these ornamental works:-- why are they not arranged horizontally, but why do they stand in the interior? All this cannot be accidental. In any case it would be a very reasonable accident with an excellent effect.

Let us now consider the exterior of Cologne Cathedral and indeed the same longitudinal axes (see again the adjacent plate). The window has the same direction lines of its rectangle and its pointed arch as in the interior, and thus the horizontal mouldings on the fronts of the buttresses are likewise located by these direction lines. Likewise the main points of the finials on these buttresses are determined by the same direction lines. If therefore the gables (wimperge) do not fit these direction lines, then occurs the thought, that they do not come from the original design, but were first imitated from the gables of the western elevation. But this western elevation was designed considerably later; it dates from about 1300 and shows quite different and steeper direction lines than the nave.

If one proceeds in the same manner with the cross section of the interior of a church, then are also added to the advantages previously noted, that not merely the points of a cross section lie on such inclined lines, but that the corresponding points of all cross sections lie in one and the same inclined plane (see the adjacent plate). One can always place in a plane the similar oblique lines of the cross section lying behind each other, i.e. all points otherwise floating around in the interior -- and there are legions of them in a cathedral interior --, and they arrange themselves for the eye, wherever it may be, always of themselves in planes.

132. Church S. Maria at Magdeburg.

In conclusion is to be mentioned another remarkable example, which has surprising power of demonstration:-- the Church Marienkirche at Magdeburg (Figs. 285 - 288). This was a Romanesque

church with wooden ceiling. In transverse and longitudinal sections, it was designed by the aid of lines inclined at 45° , which are the directing lines of its round arches. About 1200 it was equipped with early Gothic vaults and compound piers supporting them. This later introduced architecture has no relations at all to the heights of the Romanesque church, so that one does not understand why the early Gothic architect placed his capitals and pointed arches here and there and not at the heights of the Romanesque. But if one draws in the cross section the direction lines of its pointed arches, it is apparent, that the height of the Gothic upper capitals was accurately found by these direction lines, and that likewise in the longitudinal section the same inclined lines, drawn upwards from the bases, give the lower Gothic capitals. One can scarcely adhere obstinately to the direction lines, and more striking evidence can scarcely be brought for the solution here given.

Furthermore, in these investigations one must keep in mind that errors in construction exist. It is well known that no window, even in the plainest cut stone, is like another. The joiner must separately measure each window opening in the clear in sandstone; otherwise his wooden windows do not fit therein. Such irregularities are not visible to the eye. But the drawings of ancient buildings suffer from much greater defects and errors. Therefore one best has recourse to photographs. The most accurate drawings continue to be those of Viollet-le-Duc, even if after the death of the lion, French writers on art have devoted themselves to a search for errors. One would not exaggerate by asserting that the knowledge of the architectural history of the French middle ages had not advanced since Viollet-le-Duc. Writers on art have only busied themselves in hunting for mistakes in the colossal works of Viollet-le-Duc; they have found none of importance.

Most unfortunate in this respect is the French work mentioned below.¹²⁷ Similar ones are to be found in Germany, as for example the essay mentioned below.¹²⁸

Note 127. *Saint-Paul, A. Viollet-le-Duc, ses travaux d'art et son système archéologique. Paris. 1881.*

Note 128. *Dehio. Untersuchungen über das gleichseitige Dreieck als Norm Gotthischer Bauproportionen. Stuttgart. 1894.*

In the preface of the latter is said:-- "Secondly, Viollet-le-Duc caused me to reflect. In the ninth discourse of his "Entretiens sur l'architecture" and again in the Art. "Proportion" of the "Dictionnaire", he attempts a procedure similar to that given by Cesariano (whom he does not mention, although Boisseree's work was known to him), to apply it to some works of French Gothic. It is somewhat tiresome to find out what is proved by the combinations displayed with customary carelessness and the usual lack of criticism and consistency. What must primarily and strongly persuade one against it is, that the method is not uniform, but that the use of three different kinds of triangles beside each other is asserted, the equilateral, the equiangular rectangular, and the so-called Egyptian; to omit other caprices in detail. But the worst is, that the given sketches indeed always harmonize with the scheme indicated, but seldom with the masses vouched for by the original measurements, i.e., Viollet-le-Duc has held it to be permissible (unfortunately how frequently) to correct existing data according to the requirements of his hypothesis."

These serious charges are made without proofs. It is therefore overlooked, that Viollet-le-Duc not only mentions his predecessor Henszelmann in the "Entretiens" (Vol. 1, p. 394), but refers to him very exhaustively. Viollet-le-Duc writes:-- "The obscurity into which we have been cast by the maxims of the great century, neither reasoned out nor absolute, has yet been penetrated in our time by some learned Germans, and by a very small number of our own investigators. M. Henszelmann in the work entitled:-- "Theorie des Proportions dans l'Architecture" has opened the way to discoveries of incontestable value, and although in consideration of the monuments we cannot adopt all parts of his system, it is still certain that he has made a way for those, who desire to follow his principles."

But Viollet-le-Duc has not only mentioned so clearly Henszelmann as his predecessor; he likewise frankly presents Boisseree to the reader. Viollet-le-Duc writes ¹²⁹:-- "M. Boisseree, in his monograph of the Cathedral of Cologne, has shown perfectly the use of the equilateral triangle in the earlier period of construction. But the learned archaeologist does not seem to us to have studied thoroughly our monuments of the earlier period. M. Felix de Verneilh has collected some errors of M. Boisseree in

regard to our cathedrals, particularly in reference to the dimensions of Notre Dame of Amiens; but on the other hand, M. Felix de Verneilh does not attach to these general methods the importance, that they merit." Therefore Viollet-le-Duc has not adorned himself with foreign feathers. (Borrowed plumage).

Note 129. In Dict. de l'Arch. Franc. etc. Vol. 7. p. 549. Paris. 1875.

If in this manner must be answered the long discussed question concerning the auxiliary lines, it is advisable to glance at the solutions, which have been attempted heretofore.

As previously stated, Viollet-le-Duc has devoted masterly essays to this subject in his "Dictionnaire de l'Architecture"¹³⁰

and in his "Entretiens".¹³¹ He believes that certain triangles may be drawn in all elevations and sections, particularly the right-angled with equal sides, the Egyptian triangle (an isosceles triangle with base of 4 parts and altitude of $2\frac{1}{2}$ parts, and which forms the cross-section of the Egyptian pyramid) and the equilateral triangle. He illustrates this on so many drawings, that nothing contrary can be opposed, except the unintelligible fact, that mere triangles should lend beauty to buildings. A triangle is in itself nothing especially beautiful and usually has no effect in other figures considered. Viollet-le-Duc seeks to explain this as follows:--¹³²

Note 130. Dict. de l'Arch. etc. Vol. 7. p. 532.

Note 131. The same. Vol. 11. p. 385.

Note 132. The same. Vol. 7. p. 534, 535.

"Proportions in architecture are first based on the laws of stability, and the laws of stability are derived from Geometry. A triangle is an entirely satisfactory figure, because it gives the most exact idea of stability. The Egyptians and the Greeks started from that, and the architects of the middle ages have done nothing else. By means of triangles, they first established their rules for proportions, because these proportions were thus subjected to the laws of stability. - - - The triangles accepted by the mediaeval architects as generators of proportions are:-- 1. the rectangular isosceles triangle; 2. the triangle that we term Egyptian isosceles, i.e., whose base is divided into 4 parts and the vertical drawn from the middle of the base to the vertex into 2.5; 3. the equilateral triangle. It is evident that every building

inscribed in one of these three triangles will first emphasize perfect stability; that every time that one can recall by visible points the inclination of the lines of these triangles, the outlines of an edifice are submitted to the visible conditions of stability. If parts of circles circumscribe these triangles, the curves produced will likewise have an appearance of stability."

One first asks himself, why should just these lines alone and not all isosceles triangles give an impression of stability? Yes, why should not a square or a parallelogram produce the same stable impression? -- These triangles cannot be the basis of the beauty of the buildings, even by the roundabout way of stability. These triangles originate by the inclined directing lines themselves; for to each oblique direction line from below at the left to above at the right belongs the corresponding line from below at the right to above at the left, forming with it a triangle. And generally are produced just the three triangles, which Viollet-le-Duc found. The round arch has as inclined direction lines the rectangular isosceles triangle within it. The early Gothic pointed arches chiefly have their centres at one-third of the base; hence they are termed "arches on the third point" (Sarcos en tiers point). The triangle of the oblique direction lines inscribed within these pointed arches is the Egyptian. The high Gothic preferred pointed arches, whose centres lay in the springings of the arch; the oblique direction lines here form the equilateral triangle.

The theory stated hereby by the author will explain all Viollet-le-Duc's observations, and they are furthermore considerably extended. Not because certain triangles may be inscribed in the buildings beautiful, but since the points striking the eye are arranged on continuous or parallel inclined lines, and thus they produce directly a beneficial and reposeful impression on every eye, consequently all these buildings have such a masterly effect. Since the chords of the arches and the diagonals of the openings already give a very definite direction, then are the other points arranged on these oblique lines or on parallels to them. Hence one not only finds merely the inclined lines according to the directions given by Viollet-le-Duc, but also the most diverse inclinations, as they result from other reasons. Thus the City Hall in Freiberg-i-B shows great segmental arches in the ground story, if one also draws in these the chords from the springing to the vertex, they appear

as direction lines for the entire elevation.

215 If one examines the buildings in other styles, whether in Romanesque or Roman architecture, as well as those in Renaissance, one finds that in all these buildings may likewise be drawn the auxiliary lines.

Now it had also been already observed for the Renaissance, that similar triangles could be inscribed within the openings or divisions of the facade. But one may justly ask:-- what has similarity to do with beauty? Nothing. Particularly would this opinion become impossible, because these similar triangles are usually composed of points, that are not at all seen together. But that the beauty of a figure should be produced by points, which are not seen, is just the same, as if in a piece of music a number of additional and inaudible tones are played or omitted. On what can be seen affects the eye.

But this "similarity" of triangles is explained by the theory itself, stated here and self-evident. Since all oblique direction lines are parallel, thus are produced similar triangles.

Like so much else, the middle ages also probably derived this procedure from the Romans. Roman civilization was never destroyed, especially not in France. The Germans neither exterminated nor ruined the subjugated races; Roman life, ability and knowledge bloomed under the new rulers and were transformed according to their needs and views. Great barbarism never existed. Viollet-le-Duc also employed this method of direction lines on the cornices, and this with entire justice. Therefore he did not entirely of himself deviate into the error of the "triangles."

It is well known that the Renaissance drew its cornices according to direction lines at 45° . Whoever has to frequently detail knows how much this procedure simplifies the work and lends greater certainty to the artisans.

Just so is this necessary for the Gothic cornice. It must already have had a quite ugly effect on the whole, if one cornice extends almost horizontally and the other at 30° or 60° on the contrary appears folded. It is just the same with the upper surface. But furthermore the individual members of an elevation (the soffit or the upper surface) be developed in a direction surface, or they are joined together capriciously and without purpose.

154. Now Remaining.

What is still preserved from the middle ages in related statements or drawings?

There is first the representation of the cross section of Milan Cathedral (Fig. 289), which is to be found in the German edition of Vitruvius by the physician and mathematician Revius of the year 1575.¹³³ This must have been taken from Cesariano's translation of Vitruvius of 1521. This representation agrees with the basal principles developed in the cross section of Cologne Cathedral in Art. 151. The direction lines of the pointed arches serve as generatrices of the cross section. The diagonal of the outer side aisle, drawn from base to capital is parallel to it (F a G parallel to K N T). If other parallels be drawn, for example, from the base of the pier between the first and second side aisles, then is obtained the capital of the pier of the middle aisle. If the parallel be drawn from the base of this pier of the middle aisle, then are found the capitals below the clearstory vaults. The three capitals beneath the vaults of the two side aisles and of the clearstory again on their part lie on a separate inclined line, that is also drawn in. This is no longer the side of the inscribed triangle, but of one much more obtuse. Likewise the pinnacles of the tower over the crossing lie about on an inclined line together with the tops of the pinnacles of the buttresses.

Note 133. "Vitruvius des allernamhaftigsten und hochehrnachten römischen Architectt und kunstreichen Werck oder Bawenmeisters Marci Vitruvii Pollionis Zehen Bücher von der Architectur und künstlichem Bauen", printed at Basle in 1575 but already written in 1548.

On the contrary, if one regards the triangles as the generatrices of the cross section, then caprice entirely prevails. Just as the lowest triangle with the width of all five aisles as a basis ends in the air at G. etc.

A second figure, discovered in modern times by the Milanese architect Beltrami, concerns the same cross section of Milan Cathedral.

On Sept. 24, 1891, the Reverenda Fabbrica del Duomo di Milan resolved:--(Building Commission of Milan Cathedral):--¹³⁴

Note 134. See Annali della fabbrica del duomo di Milano.

Milan. 1877. Vol. II. p 54, 55.

From these consultations has been preserved a drawing (Fig. 290 ¹³⁵), that gives the cross section of Milan Cathedral only according to the direction lines of the pointed arches, i.e., treated in accordance with the inscribed triangle. Evidently on account of the cost, the greater extent in height was given up, and a more obtuse triangle was taken as the directing line. Viollet-le-Duc is thus finely justified. The most diverse triangles were actually employed as direction lines in the same building. Men had therefore previously hesitated, whether they should not go higher, as the equilateral triangle required.¹³⁶ On May 1, 1392, occurred a consultation, at which came up the following question:-- "whether the church itself, without reference to the crossing tower to be erected, should rise to the square or to the triangle? They (the engineers) declared that it should itself rise to the triangle, or the triangular figure, and not higher.

Against the opinions stated by the author concerning the direction lines it might be objected:-- now there are already mentioned the triangles; men must have proceeded with the aid of the triangles; That not by the help of the triangles, but by the aid of parallel lines were determined the different parts is however shown by Fig. 290. The expression "triangle" is plainly an abbreviated appellation, -- a technical expression, whose nature was perhaps not at all understood by the Italians. Their knowledge of architecture was indeed very slight.

Note 135. From Drach. Das Hüttengeheimniss vom Gerechten Steinmetzen-Grund. Marburg. 1897.

Note 136. See Annali della fabbrica del duomo di Milano. Vol. 1. p. 63.

135. Axial Ground Plans.

Concerning the irregularity of "truly" Gothic plans some considerations may be resumed. One finds the opinions so frequently recur, that mediaeval ground plans show interiors loosely connected together, just as the needs required, but that a so-called "axial" treatment of the ground plan was the invention of the Renaissance, a peculiarity of it not to be imitated entirely. Nothing is more erroneous than this. On the contrary, even if the middle ages did not invent the axial ground plan,

then was it transferred from the Roman, developed and zealously retained -- but in the proper place.

The middle ages distinguished in secular art, as in church architecture, quite accurately between monumental designs and easily built structures. Monumental buildings like cathedrals, monastery and great city churches, the palaces of the wealthy, the cloth halls and city halls of great cities, the middle ages developed strictly axially. The ground plans of small city and country churches, those for city halls of small cities, city and country houses were arranged in picturesque designs, that are not harmonized to the proud note of uniform axial subdivision. Thus the Gothic cathedral possesses the most severely axial ground plan, that one can conceive. Every architect adhered to the axes, so that they preferred to have the buttresses of the towers and of the crossing tower to intersect the windows, rather than to give up the uniform division by axes.

It was just the same in the secular buildings, if these could be freely developed and erected at one time. But few plans indeed found themselves in that fortunate condition. It is entirely clear that to great secular buildings belong great and populous cities, which require such structures for utility at once and possess sites and means for them. Great and populous cities only originate by large industries and commerce; otherwise the cities remain generally nests filled with petty citizens, who may indeed have means, deriving rich incomes from their manufactures and agriculture, whose parish church is rich and their city walls are secure; but no need at all exists for greater architectural undertakings, and it occurs that means and no less the site are wanting. In the closely built walled cities was no place for widely extended palaces.

Only Italy and the Netherlands can exhort these populous cities, which by the vast extent of their commerce and their industries required and built the great civic structures, which became the models for the Renaissance palaces. In the Netherlands, 219 the Cloth Halls of Ypres and of Ghent, the City Halls of Brussels, Oudenarde, Louvain and Ghent, exhibit to us axial buildings of the greatest extent. Best known in Italy are the two palaces at Orvieto; the Palace del Podesta and the Palace Apostolico. In Siena the Palace della Signoria, the Palace of the Doge in Venice etc.

That the ground plans of mediaeval castles are not models of ground plans of dwellings, as men quite commonly mean, is likewise clear. First of all must they be subordinated to the chief purpose of defense and security, on high mountain ridges, where race after race has built new additions, where these angular ground plans naturally originate of themselves; some rooms there lie higher than the others, and only narrow winding stairs permit communication.

156. Change in Forms.

Just as little basis is there for another opinion concerning variation in the middle ages, especially that each window must have a different tracery, if the building be constructed in the "true" mediaeval style. Now the proud structures of the early period never have varied tracery. All windows of like width and similar form have similar tracery. Thus on Church Liebfrauen at Treves, on the Cathedral of Cologne, on Church S. Elisabeth at Warburg, and on all early French Gothic buildings. Only the later artisans' art compelled in each window a different tracery from that of its neighbors, and usually just as little beautiful.

Chapter 8. Statics of Buildings in Middle Ages.

157. Resistance of Building Materials to Compression.

How was it with the mediaeval statics of architectural works? Despite this chapter of mediaeval architecture, documents may also be produced concerning it. That all these wonderful works have not been sustained by chance, that "artisans" experience did not create this astonishing play of forces is clear to any architect, that only approximately designs similar things and especially to erect them. But how were these mediaeval principles obtained?

Particularly instructive for this are the procedures in the construction of Milan Cathedral. Since the Italian architects showed themselves unequal to their problem, French and Germans were sent for. About 1398, the reverend commission made a contract with a Parisian by the name of Mignot. -- "Art without science is nothing!" He cried out in a detailed statement to the Italian masters, and he decided their buttresses to be too small, since they must be thrice the internal pier. Yet the Italians skilfully defended themselves. This would be correct for his Paris limestone, they said, but their marble and their Sarizzo held as much on one arm (length) on each side (thus a cube), as two arms (lengths) on each side of Paris limestone. If they made the buttresses as heavy as he desired, then would the Milan Cathedral become as dark as Notre Dame of Paris.

Mediaeval architects thus knew what compression their building materials might resist. They further computed the loads falling on the different supporting parts:-- "the load that rests upon them."

220 158. Thrust of Vaults.

In the third place, they knew that the thrust of the vault tended to push over the buttresses. Mignot objected that the choir buttresses were too weak. They now stated that all stones were cramped together, that the foundations had suitable projecting footing courses, that they would also be anchored together above by means of iron bars in the windows, and that they constructed pointed vaults, which exerted no thrust on the buttresses.

"They say, that pointed arches produce no thrust on the buttresses."

Mignot therefore further rebuked them as follows:--

"The aforesaid Master Johannes said, that art without science was nothing, and that the vaults, whether pointed or round-arched, would be nothing, if they had no good foundations. And further, that although pointed, they had a greater weight and a greater load."

159. Calculation of the Weight of Vaults.

Mignot thus had a good knowledge of the calculation of the weight of vaults.

22/ Master Johannes Mignot of Paris said in this matter, that he gave in writing at the preceding sitting all conclusions and all reasons, why he would say that the building had no durability, and other reasons he would not give.

The statements finally given by the aforesaid Master Johannes on Jan. 25:--

160. Obtaining the Width of Buttresses.

"To you, eminent masters of the building committee of Milan Cathedral, Master Johannes Mignot sets forth with respect and according to the pure truth the following, which he has represented in writing in other ways, and besides other defects of the said church, he repeats it and states, that all buttresses around the said church are neither strong enough nor able to bear the load, which falls upon them, for they must each one be thrice as strong as a pier inside the church.

The masters replied:-- in regard to the first principle, they say that all buttresses of the said church are strong and able to bear their loads and more, for many reasons. Since one arm of our marble and Sarizzo on each side is as strong as two arms of the stone of France in connection with the churches of France, which he presents to the aforesaid masters as an example. Therefore these say, that if they were one and a half times as large-- and they are so -- as piers are in the church, then are these buttresses strong and correct; and if they were larger, they would have darkened the middle church, just as the church at Paris shows, which both has buttresses after the kind of master Johannes as well as other reasons, that have injured it.

Likewise he says, that four towers are commenced, in order to support the crossing tower of the said church, and that no pier or other foundation is there, capable of supporting the said tow-

tower; indeed even if the church were entirely completed, it would at once inevitable fall down with the said tower. But in reference to this, which certainly came from preference, that some ignorant person stated, that pointed vaults were stronger and had less weight than semicircular vaults, and that further other matters were treated according to wishes and not according to knowledge, and that it was still worse -- that it was objected, that the science of Geometry had no application here, as science is one thing and art is something different, then said Master Johannes that art without science is nothing, and that it was immaterial whether the vaults were pointed or semicircular, if they had no good foundations. And furthermore, although pointed, they had a greater height and a greater weight."

161. Centre of Gravity of the Towers.

"Likewise the said, that they would make the towers for various reasons and circumstances, as they said. Particularly first to make it correct in reference to the aforesaid church and the vaults, that they correspond to the square according to the principle of Geometry; but further on account of the size and beauty of the crossing tower, especially according to the examples, as God the Lord sits on his throne in Paradise. About the throne are the four evangelists according to the revelation, and that is the reason, why they were commenced. And although two piers near each sacristy have no foundations, since they begin above the ground, then is the church strong enough for the following reasons, since in particular, there are projections on which stand the said two piers; and the aforesaid projections are of great stones cramped together with iron anchors, as before stated with other principles. And that the load (the centre of gravity) in the said three towers everywhere rests over the ground areas, and they will be built vertical and strong, but the vertical cannot fall. Therefore they say, that the towers are strong in themselves, and hence the crossing tower will be permanent, since it is enclosed in the midst of these towers, whereby the said choir is very strong." 137

Note 137. See *Annali della fabbrica del duomo di Milano*. Vol. 1. p. 209.

In the same manner matters proceeded in 1417, before the beginning of the rebuilding of the nave of the Cathedral of Gerona in

Spain. The church exhibits 72.18 ft. span and 39.37 ft. length of bay of the vaults. Since the bishop were made anxious representations on account of the bold intentions of his architect Guillermo Buffiy, especially since the choir was 3-aisled, he called a conference of architects from cities south and north of the Pyrenees, who gave their advice. The latter has been preserved.¹³⁵ Among others, the architect of Manresa Cathedral advised, that Boffiy should retain the heavy Gerara stone for the ribs, buttresses and the lower portion of the walls, but should take other stone for the compartments of the vaults, which should be lighter. Moreover the architects gave their decision quite definitely, that the buttresses were large enough to support those vaults, so far as they could foresee. And indeed -- they have sustained them.

Note 138. See Qean-Bermudez, J.A. Noticias de los Arquitectura de Espana. etc. Vol. 1. p. 261 et seq. Madrid. 1829.

If the architects had not possessed a fixed theory, they would not have been able to give such decided answers. The architect Boffiy in conclusion himself said, that the buttresses were not merely large enough, but were even one-third too large.

Chapter 9. Architects in the Middle Ages.

162. Ecclesiastical Architects.

Concerning mediaeval architects, the creators of the splendid masterworks, we apparently know but little, and that little lies in traditional legendary darkness, that transforms all reality into ghostly form and covers active men with filmy veils.

In the Romanesque period, monks, canons and bishops were the architects. The arts only bloomed in the shadow of the cloisters. The people were too barbaric and uncivilized to produce artists. A rude and wasting struggle of everyone against everything would not have permitted the arts to blossom outside the protection of the monastery walls. Only with the 13th century and with the existence of Gothic did lay architects appear. Indeed in complete opposition to Romanesque art, Gothic is an art of the laity, the other being an art of the monks.

This picture paints the history of art like other history, and on this background is depicted the entire history of the civilization of the middle ages.

And yet this is all erroneous. The error is so great, that one cannot at all conceive, how the general education in the Latin language could allow such a mode of writing history to occur, and how it could be perpetuated for centuries from generation to generation and among representatives of historical knowledge. All ecclesiastical architects of the Romanesque period owe their existence to errors in translations: only very few of them were actually regarded as architects or artists, and this is furthermore evidently flattery with scarce an exception.

Concerning the clergy architects, one thing has not yet been considered. Where then did our Romanesque ancestors dwell? Who built palaces for the emperors, castles for the nobility, houses and city walls for the citizens? If the clergy and the monks were the architects at that time, then did they also erect these buildings -- and yet all others? They must indeed not receive payment for such work. Fortunate lay owners, who found unpaid architects for these buildings also!

223 Such considerations must have caused, that architects and artisans at that time as today lived outside the monasteries, that these had practice in drawing and in building for themselves, in

order to be able to erect monasteries and minsters, when such buildings were established; and that clergy architects did not wait without practice through decades for such relatively rare buildings, in order to then pile up masterworks as their first structures. The greatest confusion has been caused by the word "Operarius."

163. Building Superintendent.

The architect is termed "magister operis" or "fabricae" (master of the works).

This title is indeed likewise given to the managing officials, to the superintendent of the building; yet the latter is chiefly called "operarius" or "massarius". The appellation "operarius" has been carelessly translated by "architect", and since for cathedral and monastic structures, one of the canons or monks was the "operarius", many of the clergy architects originated in this manner. In spite of all this, the principal records -- those of the erection of the Cathedral at Siena, prove that the Cistercian monks, who are found there as "operarii," were not architects but only supervising and financial officials, and that the "caput-magister" (head master), the architect was an entirely different person and a layman.

164. Means for Building.

To be able to commence a new structure, the necessary means must first exist. Now each church generally had a certain estate, such as farms, houses, vineyards or meadows and the like. From this estate were raised the means for the new building, as well as for the current maintenance of existing structures. For managing these means, one of the canons was designated for cathedrals and foundation churches, who was termed "operarius", "magister fabricae" (master of works, paymaster), "notarius," "massarius," etc. Moreover the church had an income from pious gifts of the offerings, payments of penitents, legacies, etc. The management of these latter was usually left to a second canon. A portion of this income was likewise transferred to the new building. Moreover on account of the new structure, money from dispensations, legacies, pious donations and gifts was collected together in great abundance. For more extensive structures, there were usually two such managing officials, either both of equal rank -- both then being termed "operarius",

-- or one was subordinated to the other as . "notarius" under the "rector fabricae."

If cities, the prince, or other corporations are the owners of the building, we find the same arrangements. Either the corporation of the city contributes two of its members for the management, then likewise called "operarii" or "magister fabricae", or they commit this to one or two monks of a neighboring monastery. In the kingdom of Naples, one is usually appointed as "expensor" (cashier) and the other as "receptor" (receiver). Authority was also frequently conferred upon these managing officials to engage and to discharge the architect; yet this was generally done by the owner of the building. In order to collect money and gifts in the vicinity or in an entire country, "petitores structurae" (collectors for the building) were employed. Donations of real estate were deeded to these or to the "operarii" personally.

Thus while in general the management of the building funds--just as today -- was separated from the superintendence of the building, we see on page 226 for S. James at Compostella, that the oversight of the building funds was also placed in the hands of the architect. Great confidence was reposed in these persons; they were men of high esteem, and so Raymund the Lombard received a canon's prebend after the completion of the building. The canons were not absolutely all priests. To mention an example; thus at S. Victor at Xanten,¹³⁹ of the 48 canon's prebends, only 7 were priest's prebends, besides

which were 8 deacons; all others passed as subdeacons. And one of these canon's prebends was named "prebenda lapicidae" (stonecutter's prebend). We find in Cologne the architect of S. Cunibert -- Vogelo -- likewise designated as subdeacon.

A complete history of mediaeval architects cannot be given here; this will occur elsewhere. Only the principal documents are here produced, which best instruct us concerning the life and nature of the mediaeval architects.

Note 139. See Beissel, S. Die Baugeschichte der Kirche des heiligen Viktor zu Xanten. p. 97 et seq. Freiberg. 1883.

a. Romanesque Architects.

1. Spain.

165. Petrus de Deo at Leon.

Let the documents relating to Romanesque architects up to about 1200 be first considered, which exhibit laymen without exception. There are no documents at all concerning monastic or other clergy architects. Commence with western Europe, with Spain.

Spanish mediaeval architecture has been treated best by the architect Street in "Some Account of Gothic Architecture in Spain." ¹⁴⁰ The writers of art histories have drawn from this work. Street took his documents chiefly from Cean Bermudez:-- "Noticias de los Arquitectos y Arquitectura de Espana." ¹⁴¹

Note 140. London. 1865.

Note 141. Madrid. 1829.

The earliest inscription is found in S. Isodoro in Leon in the pavement of the church.

"Here rests Petrus de Deo, who erected this church. He founded a bridge, that is called "Of God." And since he was a man of wonderful abstinence and flourished in many miracles, all speak of him with high praise. He was buried here by the emperor Adefonso and the queen Sancio." ¹⁴²

Note 142. See Cean-Bermudez. Part 1. p. 14.

From the two last names, according to Street, there results for his death the time between 1065, the year in which Adefonso began to reign, and 1067, the year of the death of queen Sancia, his mother. The conclusion of the epitaph indicates the high esteem in which the architect Petrus de Deo was held by his emperor and the mother of the latter.

166. Raymundo at Lugo.

For the Cathedral at Lugo the contract is preserved, that the architect Master Raymundo from Monforte de Lemos made with the Bishop and his chapter. Bermudez does not give it in the original words, and I have been unable to find the work referred to:-- "Pallares Gayoso, Historia de Lugo." But it is ¹⁴³ certain from it that this architect of a Romanesque cathedral was likewise not an ecclesiastic. The contract dates from the year 1129; ¹⁴³ ; by it are determined the following:-- Master Raymundo receives an annual salary of 200 "sueldos." If the value of the money changes, then shall he receive 3 marks of silver, 36 ells of linen, 17 cords of wood, of shoes and gaiters as many as he needs, and each month 2 sueldos for prov-

provisions, 1 quart salt and 1 lbs. candles. Master Raymundo accepted these conditions and bound himself to oversee the building every day of his life, and if he should die before its completion, then his son was to finish the structure. Thus this Romanesque architect was also a layman.

Note 143. See Qean-Bermudez. p. 24, 252.

167. Petrus at Ibeas.

The next inscription of 1132 Bermudez gives from S. Cristobal de Ibeas:--

"In the year 1170 of the Era was this building founded under the Abbot martin. Petrus Christophorus was master of this building." 144

Note 144. In Part I, p. 27.

The Spaniards generally reckoned in the middle ages from the Era, i.e., from the accession of Augustus, so that 38 years are always to be deducted in order to obtain the year of our chronology, -- thus here being 1132 A. D. It is not indicated that this Romanesque architect was an ecclesiastic.

168. Mattheus at Compostell.

Of the architect of the great Church S. Jago at Compostella -- Mattheus -- the appointment is preserved, by which king Ferdinand II designated him in the year 1168 as architect for this church:--

"In the name of our Lord Jesus Christ, Amen. It is the will of his royal majesty to take better care of those, whom he knows to serve him faithfully, and especially of those acknowledged to be busied incessantly in the sanctuaries and houses of God. Therefore I, Ferdinand, by God's grace king of the Spaniards, from love to Almighty God, by whom kings reign, and from reverence to the most holy James, our revered protector, 226 give as a gift and grant to thee, Master Mattheus, thou that hast the supervision of the building of the aforesaid apostle as well as the superintendence, in each year from my half of the monies of S. James 2 marks as compensation in each week, and what is lacking in one week shall be made up in another, so that this salary shall bring to you a hundred maravedis in each year. This salary and this gift, I give to thee for the entire time of thy life, so that thou shalt always have it, in order that both the building of S. James and thy person may

proceed better, and that those, which superintend the building, may therefore observe it more diligently, and may take trouble concerning it.

But if any one opposes this my free will gift or attempts to violate this in any manner, then may the wrath of the Eternal fall upon him as well as the royal anger, and he shall be held to pay a thousand pieces of gold for thy portion, just like one excommunicated.

This document is given at S. James on the 3rd calends of March of 1206 of the Era, while king Ferdinand reigned at Leon, Estramadura, Galicia in Asturia.

I, Ferdinand, by God's grace king of the Spaniards, confirm this writing, that I have commanded to be prepared, by my own sovereignty."

That this architect Mattheus occupied a less esteemed position cannot be considered, in view of such an appointment. How the king was anxious for the prosperity of his building, when he placed its architect in a secure position for life, might be exhibited as an example for all time. We had already found the like in Lugo. This Mattheus was further not merely an architect, but he was likewise evidently the highest managing official of the structure, the "rector fabricae", since he not only held the "magisterium" but also the "primatus" of this church.

Besides the document of his appointment, there exists in the cathedral an inscription, that the architect himself evidently placed. On the soffit of the lintel of the western doorway is:--

"[†]₁ In the year of the incarnation of the Lord 1188, of the Era 1236, on the days of the calends of April, the upper lintels (tympanums) of the principal doorway of the Church of S. James were set by Master Mattheus, who has had the supervision from the foundation of this portal upwards."

The architect evidently was also the creator of the excellent sculptures. Therefore in this place is his name and the statement of his activity without mention of any other artist, who might have created those masterly statues.

In both documents is found no support whatever, that this architect of one of the greatest Romanesque cathedrals was an

ecclesiastic or a stonemason. He also built a bridge, that of Cesures in Gallicia in the year 1161.

169. Raymund at Urgel.

Between the bishop at Urgel and his architect Raymund, the contract of the year 1175 is likewise preserved. 146

Note 146. See Street. p. 450.

227 "I, A, by God's grace Bishop of Urgel, on the advice and with the general consent of the canons of the Church of Urgel, give over to thee, Raymund the Lombard, the building of S. Maria with all movable and immovable things, since these are country houses, estates, vineyards, taxes, and with all income on account of injuries to the nearest and from penitents and with the alms of the faithful, with the monies of the clergy, as well as everything, that heretofore or hereafter on account of any judicial decision were or are determined for the aforesaid building of S. Maria. And further we give to thee for thy entire life long the maintenance of the canons, indeed under the condition, that thou shalt faithfully and without deception enclose and make complete for us the entire church, and that thou shalt build the towers and bell towers one "cord" high above all vaults, and that thou shalt also make good the "cagul" and properly with all accessories. And I, R. the Lombard, promise to God the Lord, to S. Maria, to the lord Bishop and all the clergy of the church at Urgel, whoever they may be, that I will finish all this as before written, my life being assumed, from this Easter festival as celebrated in the year 1175 for the incarnation of the Lord, faithfully within 7 years and without any deceit; likewise, that in each year I shall have and hold for the service of S. Maria myself as fifth of the Lombards, there being four Lombards and myself, and this without intermission in winter and in summer. And if I can be ready with them, then may I do so, and if I cannot be ready, then must I add so many "cementarii" (stonemasons), that the above mentioned building may be completed at the aforesaid term. But after 7 years, if I have finished the before mentioned building by the help of the divine compassion, I receive as long as I live my free and peaceful maintenance, and for the income and the means for the building I have to care further, according to the will and command

of the chapter. We, both the Bishop and the canons, further entirely forbid thee, Raymund the Lombard, by thyself or any employee, to alienate or pledge on any occasion any of the property of the building, that it has or may have in any way. With thy income, which thou hast received under thy own name, and with thy possessions, do in life and death as you please, after the 7 years. If perhaps, which may be far from us, such great unfruitfulness of the earth occurs, that we see thee very much burdened, then are we free to extend the aforesaid term according to our judgement, so that thou mayest not bring upon thyself the charge of perjury. But neither one nor any of us can allow thee this said relief from thy oath in part, excepting in full chapter after common consultation and with the consent of all. And what thou shalt increase in the income for the building shall remain for this building. But if it were necessary for increasing the income for the building, that thou shouldst pledge or exchange anything, then canst thou not do this without the advice and consent of the chapter.

"I, R. the Lombard, do swear, that I will perform all this as it stands before written, and I swear faithful duty and protection from injuries to the Foundation Church of S. Maria at Urgel according to my ability, through God and the holy evangelists.

+ Mark of R. the Lombard, I that swear, conculde and confirm this.

+ Mark of the Lord Asnallus, Bishop of Urgel etc."

This document plainly and definitely shows the position of the mediaeval architect.

What then do "Lombard" and "cementarius" mean? Since these two appellations are commonly erroneously understood, for example by Street himself as "stonemason" and "mason", then we will first fix the idea of "cemenatrius." We find it in Normandy, northern France, Sicily, Germany and England. It there signifies the architect, as we shall see. Thus one must conjecture, that "architect" is also to be understood by it here.

To desire to assume the four Lombards here to be stonemasons is forbidden by the following consideration alone. With four stonemasons, one cannot himself in seven years cut and set the dressed stones for a church of moderate size, and certainly

But if these were not four "stonecutters", why should one assume "masons," who could indeed produce no cut stone work at all? And conversely, should the four stonemasons also commonly set the work, so long as the four "Lombards" sufficed? Furthermore why should the architect merely mention stonecutters and masons, since there were also required excavators, carpenters, roofers, mason's laborers, locksmiths, glaziers and joiners?! Why are these not mentioned? -- But then who prepared the building plans, the drawings at full size, the templates? Who superintended the construction? Indeed, who had charge of the receipts and expenditures? For the management alone were required one or two men, and this also occupies much time to-day. We likewise find in the middle ages accounts, receipts and bookkeeping, also architectural drawings and patterns, all nearly the same as today. Therefore no doubt whatever can remain, that by Lombards architects, indeed from Lombardy, and by "coementarii" native architects. Lombards and "coementarii" must be somewhat similar; otherwise they could not replace each other at need. It is self evident that Raymund needed in his building shed at least one superintendent as assistant and another on the building. In the middle ages, this was done by the "aparajedor" (detailer), who made all working drawings at full size for the stonecutters, including the making of templates. Today this work is usually performed at the stonecutting yards by an architect employed by the larger master stonecutters. But since during the middle ages the stonecutter's work was almost without exception done directly under the architect by the day and without master workmen as contractors, then must these templates have been prepared in the building shed ¹⁴⁷, and the building superintendent himself oversaw the stonecutters. Thus is quite naturally explained the purport, that if Raymund with the four assistants brought with him did not suffice, he must engage native architects or superintendents. It would have been a dearly bought canon's prebend, even if Raymund had had to pay for the masons' and stonecutters' work. For if we assume the cathedral to have cost only \$250,000 -- a small outlay for such a work -- then the masons' and stonecutters' work would have required at least \$75,000 without the materials. If Raymund was in possession of means

amounting to \$75,000, then he did not need to exchange it for the maintenance of a canon. Before the rude reality vanishes even the most beautiful stonecutter's fables!

Note 147. The proof thereof is found in the accounts of Prague Cathedral and elsewhere. (See Neuwirth, J. *Die Wochenrechnungen und der Betrieb des Prager Dombaus in den Jahren 1372 - 1378. Prague 1890. p. 426 et seq.*). -- Thus the cathedral architect Peter Parler received from Oct. 3 d to 9 th, 1372; 3 groschen "*pro claviculis parvis magistro ad asseres formas*" -- further: --

From April 4 to 11, 1372, "*pro claviculis parvis magistro ad formas 4 gr. sol.*"

From Oct. 10 - 17, 1372, "*pro claviculis ad formas magistro, 2 gr. sol.*"

From Oct. 17 - 24, 1372, "*pro claviculis CCCGtis magistro ad formas 8 gr.*"

(For remainder, see bottom of page 229 of text).

Why did the Bishop of Urgel bring architects from Lombardy? The Lombards were esteemed in the early middle ages as particularly excellent architects. Then we come to the Romanesque architects of Italy.

2. Italy.

170. Comacine Architects.

The book of the laws of the Lombard king Rotharis, who died in 652, first shows us that a law relating to accidents to buildings already existed at that time, and that it was then usual to engage "Comacine masters" for the erection or rebuilding of structures. Thus we read in Section 144 the following:--

144. Concerning the Comacine masters. If the comacine master and his associates take the rebuilding or the erection of the house of any person at a fixed agreement as to payment, and it happens that any one is killed by this house or by a falling beam or stone, then shall it not be required for the owner, whosoever it may be, if the comacine master and his associates do not make compensation for the death or injury; who by reason of a contract for payment has taken (the building) for his own uses and therefore deserves to bear the blame.

145. Concerning the masters called or brought. If any one calls or brings Comacine masters -- one or more -- to design or daily help a

to daily help among his bondmen, and it occurs that one of these Comacines is killed by the building, then shall he not be called to account, to whom the building belongs; for if beams or stones falling from the building kill or injure any slave, the blame shall not be laid on the master, but he that caused it must himself bear the damage."

These Comacine masters then appear as architects and as building contractors, just like our modern architects. Barbarism must not have been at all so great, and the Lombards cannot have been the frightful barbarians, that they are represented. Indeed the Italians today endeavor to establish these "Lombards" as native Romans or Italians; yet this is erroneous.

The region around Lake Como furnished after the 6th century upper Italy with architects as well as artisans. These mechanics and architects also traveled far to Germany and Spain. They are termed Comacines. Since these countries were already subject to the Frankish king Theoderic in the 6th century, and were but temporarily devolved on the Lombards under Alboin, and since they had always heard of the German empire after Otto the Great -- so they preferred to call these Comacines "Germans" (Tedeschi). The Comacine names, which can be found in the centuries before the year 1000, are also all German:-- Wuolvin, Rodpert, Guoto etc. One can consider and prove, that also after the year 1000 these "Germans" created the main lines of the architecture of upper Italy; so numerous are they found. Only in Germany has this been overlooked.

Such a Comacine from the lakes was surely Jacopo Tedesco, the architect of S. Francesco at Assisi, according to Vasari. We Germans indeed do not find it necessary to deny our imperial Germans, especially when they may occur by reason of an erroneous translation, as Thode does. 149

Note 149. See Thode, H. Franz von Assisi und die Anfänge der Kunst der Renaissance in Italien. Berlin. 1855.

From Section 145 it also appears how the Lombards worked, if they did not appear as contractors. Men gave them their bondmen as laborers. These bondmen carried on the various trades; thus among them were carpenters, masons etc. Between them labored the Comacines, i.e., naturally as superintendents, laid out the building, gave them the necessary drawings and su-

supervised, or if necessary, instructed the bondmen. If they had taken the building as contractors, then must they themselves have provided such assistance.

More detailed conclusions are given by other legal decisions, that have been preserved from the late Lombard period, the time of king Liutprand (died 744), concerning the payment of Comacines:--

"Item memoratorio de mercedes Comacinorum."¹⁵⁰

Note 150. From Neigebaum, *Edicta regum Langobardorum*. p. 113. Munich. 1855.

23/ "1. Of the work of the hall (sala).

157. If he shall do the work of the hall, then he is to reckon for one solidus¹⁵¹ 600 bricks by count. If in the upper story, then 400 for a proper solidus, where 15 bricks extend 20 feet.

Note 151. The solidus was introduced by Constantine the Great in 330 A. D. It was of 23 carat gold and 72 passed for a Roman pound. -- Semisses, trimisses, quadrantes and siliquae were 1-2, 1-3, 1-4 and 1-20 of a solidus. (From Mitt. d. K. K. Gent. Commission etc. 1871. p. 67).

2. Of the masonry.

158. But if he shall build masonry, that is one foot thick, then shall the payment be doubled, and up to 5 feet be five-fold.

And of this masonry, 225 feet goes for one solidus.

But if he must provide scaffolding, then he gives 180 feet, for one solidus, and indeed to 5 ft. high, but the length is 15 feet for 1-3 solidus.

Likewise also, if he plasters the wall, 600 feet go for one solidus.

282 And if he must enclose it by posts, 1500 feet go for a proper solidus.

And if he turns arches, then 12 feet go for one solidus.

But if he hews beams straight, large or small, then 20 ends for 1-3 solidus.

Tenons and head bands are furnished, five for one beam.

3. Of the wages of the Comacines.

159. The master shall receive as maintenance, for 1-3 solidus 3 quarters of rye, 10 pounds of bacon, 1 urn of wine, 4

sextarius of vegetables, 1 sextarius of salt, and these shall be charged to his wages.

4. Of the Roofing.

160. In like manner, if he shall make Roman work, he shall reckon it as Gallic work, 1500 feet for one solidus.

And be it known, that where one tile is laid, there are omitted 15 shingles, for 150 tiles replace 2500 shingles. And if he lays "massa", 500 feet is for one solidus.

5. Of the Fireplace.

161. If the master must make a fireplace, then he receives for such work one-third solidus. And if he makes pine carvings, then 15 feet go for one solidus. But if he makes "peuma" ¹⁵², then for this as many twentieths of one solidus as it has feet. And if he makes "karols" with plaster, then he gives 4 karols for 1 - 3 solidus. And maintenance will not be charged to him.

Note 152. Pleuma id est palu de lugo as explained by the Glossae Cavenses. (Pertz. Legum. t. IV.). (Pleuma or peuma is a wooden step).

6. Of the Marble-worker.

162. If any one shall make marble slabs, he gives 15 feet for one solidus. And if he makes columns of 4 to 5 feet, he gives 3 columns for 1-3 solidus. Maintenance will not be charged to him.

7. Of the Stoves.

But if he shall make a stove in "pisile" with tiles, and it has 3 or 4 parts and with the "pinea" contains 250 tiles, then if the pinea itself has 25 tiles, he receives 2-3 solidus, and if it has 1000 tiles, he takes 1 1-3 solidus as his pay.

8. Of the Walls.

If any one shall make a wall up to 100 feet, he receives therefor 20 soliduses. Maintenance will not be charged against him. But for the wall of 33 feet, 4 soliduses, the wall up to 26 feet, 3 soliduses, and the wall of 12 feet, 1 solidus. Maintenance will not be charged against him."

The proof of the accuracy of this translation would here go too far. It will be given elsewhere.

Whether these Comacine masters traveled into adjacent countries in order to seek for work, might appear doubtful from both these statements. Yet from a later period has been prese-

preserved for us a letter from two ecclesiastics to the Archbishop of Milan, that gives a more definite explanation of this, how these Lombards also traveled to Germany to erect buildings there. Cesare Cantu discovered this and von Pflugk-Hartung published it.¹⁵³ It would not appear from this letter in what country and place he was born, to what years he belonged, if a series of other letters of the same clergyman and the answers of a canon Martin in Milan to the latter had not been preserved in a transcript of the 14th century, in which was added to both names the designation of Ratisbon priests. The first of the two ecclesiastics, Gebhard, was the founder of the Monastery of S. Mang (Magnus) at Stadthof opposite Regensburg.¹⁵⁴ The letter perhaps refers to the building of this monastery; it runs as follows:--

Note 153. Iter Italicum. I. p. 477 et seq.

Note 154. See Ratzinger's corresponding essays in Historisch-Politische Blätter. Vol. 110. p. 97, 187.

218 "To Obert,¹⁵⁵ the skilful guardian of the Milan Church, from Paul and Gebhard, the humble observers and lovers of his honor, who by God's grace is powerfully aroused against the evil and forsworn. The bringer of these presents, a man of good habits and an honorable fosterer of science, we recommend to thy love, most allworthy Bishop, and to the respect of thy citizens - - - that he, covered by the shield of thy good will, may suffer no violence from the dishonorable and inconsiderate arrogance of perjured men. For we take God to witness, that we are not conscious, that they have any cause against him, besides envy alone, to which they add avarice and lie, that we still owe them the amount of a talent, that God knows we have never promised them, perhaps if we could not give credence to their lies, in order to forge the worst slanders against this brave man at home. What would I, Gebhard, in particular, who is regarded as the founder of the building, promise these fellows, when I have immediately contradicted their statement in direct words, that they come from the master? Likewise have they presumed in their shamelessness, when I was in Rome, to come there, and so far as time permitted, they began to set up the stones. When I found them there, I was unable to speak before the removal of the centres; but hindered by the brothers, I scarcely

compelled myself to not send them away, and I indeed permitted them to break the stones; but to execute the masonry, I utterly forbade them. For also in the past year they deceived me, when they brought me an architect, as though he were sent by Lord Martin. At last being compelled to conquer evil with good, I took them to a rich abbess, who had a great though simple building, in order to be useful to them, as I had not deceived the abbess. Yet it vexed them, since our building was not far from them and was praised by all, while defects in that one were blamed."

Note 155. The original of this document is to be found in Archivio Capitulare di Sant' Ambrogio at Milan and dates from the time between 1148 and 1150.

"Thereupon, as we have written in a letter, they desired to make peace with me again, laid their hands on the relics of the saints and swore, for which I still have witnesses, never again to injure our building nor our workmen on the building. Since they have now violated this and have accordingly become outlaws, they are rather to be compelled to a true penitence, than left to a deceitful trial. But we urgently request, that thou dost write to the Bishop of Como concerning what is written about them, and in combination with a deputation of thy citizens, that thou dost secure our protegee from their power. The honorable priest Hartung, whom we have received on the recently celebrated feast of our particular protecting saint, the confessor Dedelrich, awaits with devotion and illness your blessing. The God of all peace strengthen thee for eternal blessedness."

We see from the literal words, that the appearance of Lombard builders on this side of the Alps was nothing unusual, and that those here came from the diocese of Como. This letter must remove all doubt concerning the name "Comacine." They were actually persons from Como, who traveled in the world as builders, just as we have found them described 500 years earlier in the statute book of king Liutprand. But this letter likewise shows, that the Gomacines comprised both architects and artisans among themselves, and that both individual architects, like the one here recommended, as well as separate societies of artisans went into foreign countries.

Furthermore, the writer of the letters does not appear to have paid the people for the "preparation of the stones," since he mentions nothing of this. And thus the demand of the people does not seem entirely unjustifiable. Even today, the owner does not believe anything to be owing, so long as he does not see the building in existence.

Whether the "lapides" are bricks or cut stones cannot be decided with certainty; since "lapides caedere" may signify both to break and to cut stones. In the first case it refers to dressed stones, in the latter perhaps to bricks, which after the Italian custom were apparently cut out from flat cakes of clay with a knife. But one nowhere finds bricks in the old buildings in Regensburg.

If the kind of stones is then not made clear by this letter, we have seen however, that the Comacines were acquainted with brick construction and making, so that such a Comacine band or such a Comacine architect might at any time again introduce brick building into Bavaria, if it ever disappeared there.

The existence of this Comacine architect also proves, that neither before the year 1000 nor after this was architecture preferably or even exclusively placed in the hands of the clergy.

But if in the older civilized lands architecture was not in the hands of the clergy and the monks, but was left in the hands of the laity, there is likewise no reason, indeed not even a possibility to be seen, that in the then mission or colonization countries of Westphalia, Saxony, Thuringia, Altmark, Brandenburg etc., architecture was practiced by the clergy. It was just as colonists were drawn there, also architects were called from their native country.

That among the lay brothers were to be found architects here and there,-- naturally and usually citizens -- is self evident and changes nothing in the state of things, since such lay brothers were even previously laymen, the architecture like industrial art and trades remained in the hands of the laity, and thus the culture of those times was again quite different from what has been assumed heretofore.

But we further know from the documents, that in the monasteries just the citizens and mechanics were laymen and never lay brothers. In spite of all, they were counted in the "fam-

"familæ ecclesiæ" (church family). This stands in the "ancient statutes of the Abbey of S. Peter of Corbey." 156

Note 156. In D'Achery. Spicil. IV. 1. Paris. 1723.

"Of the laity. In the second chamber are fourteen; among them two goldsmiths, one parchment maker, three charcoal burners (köhler), four carpenters, two physicians. These are beyond the cloisters."

The same is stated for Zwiefalten. 157

Note 157. See Ortliebi de fundatione monasterici Zwiefaltensis libri II in Monumenta Germaniæ historica, Scriptores X. p. 77. Hanover. 1852.

"In our lawful protection were engaged farmers, vinedressers, bakers, tailor, smith and pedlars, as well as those practicing various arts and trades."

Furthermore it results from this, as from other documents, that the trades here mentioned were separated at all times just as today, in particular there prevailed likewise in building a complete separate development of all industries and minor arts, as of the higher arts. There were rather more different trades than today. The contrary opinion is entirely baseless and it therefore occurred, that all Latin appellations or artisans, whether "carpentarius", "magister fabrilis", "casarius", or "operarius", "murarius", "lapicida" or "caementarius" has been translated by "architect."

171. Lanfranc at Modena.

The Cathedral at Modena was to be restored. In Muratori 158 is to be found the following statement concerning it in the "Translatio S. Geminiani."

Note 158. See Muratori. Rerum Italicarum; Scriptores. Vol. 6. p. 90. Milan. 1725.

"Therefore in the year 1099, it was sought by the inhabitants of the aforesaid city, where the designer of so great a building, where the builder of such a structure could be found. And finally by God's grace, a man by the name of Lanfranc (Lanfranchus), a wonderful architect was found, by whose advice the corner stone was laid in their basilica by the people of Modena."

Thus in Modena about 1099, it was very well known, that not every layman or monk could build a cathedral, also that one could not entrust such an art work to anybody skilled in build-

building, but in accordance with duty, it was necessary to look around for the best powers; it was even known that this cathedral must be designed before it could be built.

At Modena, it was regarded as God's grace, that finally a skilful architect was found, prepared for such a problem. It is to-day a burdensome necessity for the lovers of mediaeval art, which avails to prevent the fall of the structure, the disputes with contractors, to keep within the estimates, and it is unfortunately necessary. It is superfluous for art, the learned connoisseurs take care of this by the aid of the better informed art workers. And this is "to live well under the crozier." All these misunderstandings are so bad for art and have gradually caused the erroneous opinion, that in the middle ages ecclesiastics and stonemasons created art works; to them we owe the monstrous new buildings, as well as such lamentable restorations of ancient ones. In the interests of art and art works, one cannot speak too strongly against these errors.

The architect of the Cathedral at Modena was likewise not an ecclesiastic. On the choir has been preserved the following inscription relating to him. 159

Note 159. See Zimmermann, M. G. Oberitalische Plastik im frühen und hohen mittelalter. p. 36, 37. Leipzig. 1897.

236 "Lanfranc, famous for his gifts, learned and skilful, is the first architect and supervising master of this work. When he began to create is shown by the present lines, 1099 years after the birth of the Lord."

We are likewise instructed concerning the sculptor of the Cathedral by an inscription on the left and above the principal doorway.

"While the crab strives for the course of the triumphant twins, on the ides, the fifth at the time of the month of June, in the year one thousand one hundred less one (1099) of the incarnation of God, was this House of S. Geminianus founded. Of what great honor among sculptors thou mayest be worthy, O William, is shown by thy work."

172. Fred at Bergamo.

The name of the architect of S. Maria maggiore in Bergamo is made known by an inscription in the entrance archway of the eastern vestibule.

"The said church was founded by the Master Fred in the year of the incarnation of the Lord 1137 under Pope Innocent II and Bishop Roger, while king Lothair reigned." 160

Note 160. Merzario. I maestri comacini Storia artistica di mille ducento anni (600 - 1800). I. p. 167. Milan. 1893.

173. Martin at Verona.

An inscription on S. Zeno at Verona runs as follows:-- "In the year of the incarnation of our Lord 1178 and in the 11 th indiction at the time of the lord Alexander III and of the lord emperor Frederic and of the lord Omnebonus, Bishop of Verona, lord Girard, by God's grace the honorable Abbot of the Monastery S. Zenone, among many other good deeds done to the monastery, with his brothers beautifully ornamented the tower of this church and added new stairs to the old, further wonderfully building the spire, as all may now see, with the help of Salamo and Reinhold, the massari (managers) of this building, and other pious men. This building was constructed by Master Martin, and it cost 500 pounds and more. In the same year was again made peace between the Church and the emperor. But from the restoration of this tower 58 years had passed away, and 40 years from the restoration and enlargement of the church."

The upper stories of the tower thus date from 1120, the nave from 1138.

This inscription is very instructive in many ways. It gives accurately all engaged on the building according to their work and their building functions. The abbot is mentioned and modestly enough, not writing that he built the church, but that he permitted it to be erected, indeed not merely himself alone, but together with his brethren. Such owners, as already stated, are usually so much convinced of their own activity, that the formula simply runs:-- the abbot built - - -. He further had the church constructed by the aid of two "massari", Salamon and Reynold. Those are the managers of the building.

The word "massari" usually appears as a designation of the manager of the property and income of a community of monks. It denotes the same that is elsewhere termed "operarius", but indeed with the difference, that the latter appellation makes more prominent the management of the building funds. But it is just as erroneously understood and translated as "operarius."

Likewise other pious men -- probably the community living in the vicinity -- have not withheld their services. On the other hand, the architect is Master Martin; he erected this building, that cost 500 pounds and more. -- The actual story is thus correctly told without heaping praise on the owner, whose labor is usually small, being silent concerning the actual worker, the artist, in a dishonorable manner. Whether Master Martin merely superintended the building as architect or also erected the same as contractor is left open. In any case, the architect of this prominent Romanesque church again was not an ecclesiastic.

174. Briolotus at Verona.

In conclusion, an excellent inscription is preserved in the interior of the church on the southern wall, that praises Briolotus, the architect, who created the great rose window of the facade.

"Let all praise Briolotus, since he deserves reward. Heaven has the artist; his work, so correctly wrought, recommends the artist; it shows him as most highly skilled. He made here the wheel of fortune above in the church, that I pray thee to observe. He likewise first designed in Verona the stone bath, from which by virtue of the prayers of the just, so great a multitude have so boldly passed to the kingdom of blessedness, in which life is prepared. Forsooth a man worthy of veneration, who represented the afterworld with such excellence; for his work is in the temple of light."

About the wheel (window) itself stands the following verse:--

"I, fortune, bind all mortals together;

I raise and depress, give to all evil or good."

228 The recognition obtained by the architect for his indeed beautifully designed and finely executed rose window leaves nothing to be desired. It shows the esteem in which these persons were held. He likewise bears no ecclesiastical title.

3. Germany.

175. Odo of Metz at Aix-la-Chapelle.

Likewise the oldest and most venerable building in Germany, the Minster of Charleſagne at Aix-la-Chapelle, has a layman as architect; Odo of Metz. In a manuscript of the 10 th century in the Imperial Library at Vienna is found the following:--

"Below in the chapel stands inscribed:-- this hall, remarkable

for dignity, was erected by the great emperor Charles. The famous Master Odo built it; brought up in the city of Metz, he rests there."

Note 161. See Jaffe, *P. Monumenta Carolina*. p. 536. Berlin. 1867.

176. Plober at Utrecht.

A Frisian architect Plober, "Latomus peritissimus," murdered in 1099 the Archbishop Conrad, who had defrauded him. 162

Note 162. See *Chronicon insigne Monasterii Hirsaugensis, Ordinis S. Benedicti, per Joannem Tritehemium*. p. 121. Basle. 1559.

"Conrad, Bishop of Utrecht, was killed by a Frisian. The circumstances of his murder were the following:-- Since this bishop had commanded a monastery to be built in a marshy part of the city, and the foundation could not be laid on account of the swampy ground, there was present among others a very experienced Frisian architect by the name of Plober, who promised under penalty of his head to build the church in that place by some secret art and according to the desire of the bishop. But furthermore since he required unlimited money, then the bishop dissembled his intentions and ensnared the son of that Plober by rich gifts and obtained from him the secrets of that art. He soon completed the church, already commenced, without further superintendence. Thereupon great anger against the bishop seized on the architect, and he tried to then kill him, which he accomplished in the most shocking manner."

177. Richolf at Bamberg.

The architect of a Monastery of S. Otto, Bishop of Bamberg and apostle for Pomerania, was a layman. In the necrology of the Monastery on S. Michael's Mount at Bamberg is to be found the following entry of about 1121:--163

Note 163. See Jaffe, *P. Monumenta Bambergiana*. p. 569. Berlin. 1869.

"3rd of the nones of March. Richolf, layman. This is he, that built our church under lord Otto, the Bishop."

178. Enzelin at Würzburg.

Concerning a prominent Würzburg architect of about 1133, the following document has been preserved:--164

Note 164. See *Archiv des historischen Verein für den Unter Mainkreis*. Vol. 4. heft 1, p. 8.

239 "In the name of the holy and undivided Trinity. I, Embricho, by the consent of all Bishop of this Würzburg Church, to all believers in Christ, in the future as well as at present, and especially our dearly beloved sons, the clergy and people of Würzburg, wish from my heart eternal welfare. Since on account of age, the roof of our cathedral has almost entirely decayed and has fallen or threatens to break down, then we have thoroughly considered, how we should overcome this evil and could replace the entire minster in better condition. And since God ever aids efforts for good, there has been designated to us by the acclamation of all our citizens a good man, who also built for us the bridge in an excellent manner, the layman Erzeli~~us~~, to whom we have entrusted the management and superintendence of the restoration and decoration of our church in a sufficiently beautiful and a particularly rich manner, so that he, who constructed the bridge and the street to the church, may himself also ascend by the restoration of the church to the royal palace, i.e., to the heavenly palace. Therefore whoever like the prophet loves the ornamentation of the House of God, in order to receive the reward of the prophet, may wisely bring the mites, which the widow brought and was praised by God, and so every one may freely contribute according to his means for this building, so that he may receive in the House of God a habitation for his gift. But in order that the aforesaid man, Enzeli~~n~~, may better carry out the management of this building, we have by our powers made free the chapel, that he himself built in our suburb of Bleichaha, and separated it from the parish to which it belongs, on the advice of the brothers, so that the people dwelling around this church may have their own priest and both baptism and burial forever; But he shall annually collect the money, which is termed mass money, so that he may bring two parts thereof to the brethren of the cathedral church at the Lord's Supper, and he may retain the third part for himself, without regard to any one whatever, and that he be first installed by the dean of the cathedral church or receive from the hand of the bishop the gift of the altar, or obey with the other priests the archdeacon of our city. Therefore the entire portion of the city, that lies between the river Main and that street, which leads from the city wall to the

mill of the abbott of S. Stephen, this part of the city I say, and all inhabitants therein have we set off for the future of this church- Nevertheless we assent to the requests of the manager Enzelin, that no priest be in this church, except the one desired by himself to oversee the people, and that none other than from the relationship of Enzelin shall ever be installed there as priest, excepting that within his relationship shall be none suitable. All this have we done with salutary consideration and from love, and have therefore confirmed the present writing by our seal and ban, that all may not know the eternal love, who dare to violate or wickedly alter it.

To which are witnesses:-- Otto, provost; Babo, dean; Hertwig, Gebhard, Siegfried, Bruno, Kunard, Burchard, Bernger, Wignana, Emich. Laymen:-- Godbold, Count Rupert and his son Gerwig. But this was done in the year 1138 of the incarnation of the Lord, in the 7th indiction, under the reign of the famous king of the Romans, Lothar, second of this name. - - - In the 9th year of his reign."

In what esteem the architect Enzelin was held, that he was a rich man, and that he built bridges, streets and churches, is sufficiently shown by this document.

179. Wernher at Prague.

In Bohemia is found the following statement in relation to the architect of the Church of the Convent of S. George on the Hradschin at Prague. 165

Note 165. See Fonte's Rerum Bohemicarum. II. p. 236, 237.

"By this report and moved by the Holy Spirit, they visited the monasteries, searched through the churches, examined the altars and sought especially for the relics of S. Ludmila, their protecting saint. After they had brought the stonemason and architect Wernher, they asked him to seek among the stones and firebrands. And behold, as God willed, Wernher found the coffin uninjured and untouched by fire. He joyfully returned to the ladies, and while he for joy demanded reward, he reported the pious affair.- - -. Also it could not be passed over, how wonderfully and for the instruction of the ages the theft of Wernher was brought to light. He had privately taken away a part of the body of S. Ludmila, the champion of Christ, and he had gone home. In order to build the Temple of God, he

brought two with himself, who died after the beginning of the building; in the following year two others; in the third he himself died. When men had seen this, his son went to Bohemia at the command of the neighbors and relatives, told what had happened to his relative to the chancellor Gervanus, who admonished him, and thus he returned what had been taken away to the church again in the name of our Lord Jesus Christ, to whom be honor and praise through all centuries."

If we must also limit the documents to the Romanesque period, then let there be made here still a digression to the Cistercian architects, since these are also still regarded in the Gothic period as having been monks.

180. Architect at Walkenried.

Concerning an architect of the Monastery of Walkenried in the Harz mountains, the following has been preserved:--¹⁶⁶

Note 166. See Chronicon Walkenriedense Eckstormii. p. 109. Helmstadt. 1617.

"Once in our monastery, an architect was brought from elsewhere. His wife, who found herself under difficult conditions, followed her husband before the Ellrichs Gate, and by accident she saw two drunken young fellows exchange sword strokes. One of these struck off the other's head. When the wife saw them, she was terrified, returned into the monastery and brought forth a child, whose head was wanting."

We have here also in a Cistercian monastery a married architect. And even if his name and the date are not transmitted to us, these are not lacking in other Cistercian monasteries.

181. Diterich at Arnsburg.

At Arnsburg in the Wetterau there stands as evidence in a document of the year 1215:--

"Ditericus, master of the works."¹⁶⁷

Note 167. Baur, L. Urkundenbuch des Klosters Arnsburg in der Wetterau. p. 6. Darmstadt. 1851.

182. Walthelm and Heinrich at Saar.

In Saar (on the frontier between Bohemia and Moravia), the son of such an architect became a Cistercian monk, after he had himself been an architect. This monkish architect wrote down the chronicle of Saar in Latin verses, and he states therein:--¹⁶⁸

Note 168. See *Fonte's Rerum Bohemicarum*. III. p. 548. Prague. 1874.

"And whoever desires to know who I am or what is my name, listen and I will tell, as it is to be narrated in poetry. In the schools was I called Heinrich the stonecutter, son of the stonecutter Eckward, who built this choir and also constructed many other things - - -. Under father Walthelm I came with father and mother."

Therefore proofs that lay architects built Cistercian monasteries thus exist; on the other hand, we shall see that proof for the contrary is not preserved, that the monkish architects only owe their existence to faulty translations.

188. Manager of the Building and Architect at Siena.

In von Jahn's *Jahrbüchern für Kunstwissenschaft*,¹⁶⁹ Charles Eliot Norton published the "documents for the History of the Cathedral of Siena," and he has entirely misunderstood them. About 1260 occurred a revision of the government at Siena. In the new statute the following passages treat of the duties of the podesta, of the head of the state officials, to which he had to swear. In this occurs the followinm:--¹⁷⁰

Note 169. *Jahrg.* 5. p. 66 et seq.

Note 170. *Urkunde* No. 1. c. a. D. (about 1260) in *Reale Archivio di Stato at Siena*, preserves this *Siene*se statute.

"Of the right of the Operarii of S. Maria. -- And within one month from the beginning of my official service, I had the operarii of the building of S. Maria sworn to pay all receipts, that come into their hands for this building or by occasion of it, into the hands of three lawful men for fines, which the lord Bishop with the consuls of both chambers of trade and the 24 priors, or with the majority thereof, who together with the lord Bishop shall be obliged to make this selection for each three months, so that they may thereby oversee the ordinary expenditures. And there three will I require to take upon themselves all debts incurred for the said building, if the lord Bishop will take the building of S. Maria and the debt under his protection, and the said three shall be held to give account, before the council of the bell and of the people each three months, and the podesta shall be required to have the account rendered by the said three, as it is stated."

From the same.

"And I will call the council of the bell of the community during the entire month of January, in order to find concerning these men, who shall be charged with overseeing the account of the receipts and expenditures of the building of S. Maria, also as shall proceed for the said building and furthermore, whether one operarius or several are to be engaged, and what the council or the majority thereof determine, that will I perform and observe."

Of the right of the same.

"And I will have the operarii of S. Maria sworn, that if they have 10 pounds, they are to pay the same out for supplies for the building, for works of improvement and construction of the building, and none shall oppose this work without the direction of the lord Bishop and myself; and changes in the building can only be made by direction of the lord Bishop and myself."

Document No. 3. of May 7 th. 1272. 171

Note 171. *Jahrbücher für Kunstwissenschaft. Jahr. 5. p. 74 et seq.*

"In the year of the Lord 1272, in the 14 th indiction, on the 7 th day of the month of May."

"Be it made known to all, that in the assembled general council of the city of Siena in the Church S. Christopheri, after the usual custom by the signal of the bell, and by the received command of lord Orlandinus of Canossium, by the grace of God and the king, podesta of the city of Siena, on the advice, the consent and the express words, and at the command of lord Ronaldus, of the chamberlain lord Ronaldinus, of Bartolomæus Crescentius, of lord Tomagius, of the judge Genterius, of lord Palmerius and of lord Skotia, of the talomeers, the four provisors of the said city, and with the consent and at the order of the said council, and at its expressed desire, and that the same chamberlain and four provisors of the city and of the afore-said council, brother Melanus of the Monastery of S. Galgamus of the order at Castellum (Cistercian ?), although absent, is made, agreed upon, created and determined as agent, orderer and operarius of the "church fabric" (opera), as well as of the building (opera) of S. Maria, the Cathedral of Siena, so that the buolding may thereby come to an end in erection and comple-

completion and in everything necessary for this entire structure. And they determined and chose him in all form as revisor, adviser, manager and official of the said building, and that for the same he must request, collect, gather and assume each and every debt, everything contracted or extra, that is still outstanding for the building and for those, from whatever person and from wherever it comes, that he discharge altogether and completely the debtors to the same, further that he transfers claims, exhibits contracts and accounts, or also receipts for payments and for transfers of claims, that he may make settlements and answers to complaints, to receive loans for the building, that he may pledge the property of the same and may sell property of the building, that he may do all and everything, which he regards as necessary for the building.

And they gave to, stood by, and charged this brother Melanus with the general and free management in and for the aforesaid and with all, which a true and lawfully authorized operarius, administrator and agent should do. And they promised to regard and receive all his acts as done by right and justly, and on the other hand not to be concerned for any other reason or claim or in any other occasion of pledging the property of the said city.

Done in Siena in the Church S. Christopheri before Martin Guaverii and Gilius Cojarius, the "castaldes" of the city of Siena, as witnesses present.

I, Bonaventura, notary formerly of Bonaguida, now secretary of the city of Siena, have been present during the above transactions, and what is to be read above, I have written and published at the command of the podesta and of the council.

I, Guido Rubens, formerly judge of Jannis and notary, have seen and read that above written in the original and unchanged document, that was published by the aforesaid Bonaventura, and I have taken this from him, and while I have added or removed nothing excepting the subscription of this notary at this side, so that I have faithfully executed it and together with Bartolomeo Herigi, notary, I have industriously read and compared, according to the aforesaid zealous assistance, the Sienese made in the Church of S. Christopheris in the year of the Lord 1272.

Document No. 5. A. D. 1337. ¹⁷²

Note 172. See von Zahn's Jahrbücher für Kunstwissenschaft. Jahrg. 5. p. 77 et seq.

"In the name of God. Amen. Here begins the first determination of the constitution of the city of Siena.

Concerning the protection and the defense of the Cathedral of the Holy Virgin Maria and of the Baptistery of Siena and of its property and rights, and furthermore that during the building of the said cathedral, there be constantly one watchman, one operarius, one clerk, and six advisers over their offices. If the cathedral of the bishopric of Siena lacks a shepherd, then shall the podesta of the city of Siena, on the request of the chapter of the said church, be held to defend and to preserve the property of the said church and of the bishopric. Likewise shall there be constantly a watchman for guarding the building and the site of the said church, who shall receive payment from the operarius of the said work and from the city of Siena in each month 20 soldi as his wages; in order to complete the said work, an operarius shall constantly be there, who can read and write, and who shall receive in each month 5 pounds denare as his salary. And he may give wine free, according to his judgement, to all of the said work, who are in the service of the said work, so far as he may think proper for the improvement of this work. There shall be constantly on the work a good clerk, who shall be paid from the moneys of the said work in each month 4 pounds denare ¹⁷³ as his salary and no more. And six able and chosen men from each third of the city of Siena, as advisers of the said operarius and of the building. On their advice and foresight must the said operarius do all and each for the said building. And no work may the said operarius, or the actual master on the said building commence, arrange, make or allow to be made, or any one of them, without the express permission of the said advisers and of the architect, or at least of two thirds of the same. And if the said operarius with the masters ¹⁷⁴ or one of the same acts in any wise contrary, so shall they know, that he shall pay all expenses and costs out of his own pocket, and in this case the said advisers shall report under oath the act in contravention to the upper syndic of the city of Siena.

Note 173. The operarius receives 5 pounds and the clerk 4, a proof of the relatively small payment to the operarius, so that his work can have been but small. We likewise find the same in Prague.

Note 174. Master then meant in Italy any mechanic; the architect was called as a distinction head master, ("caput magister or capomaestro", like "protomagister in lower Italy. What is here ordered, we find carried out in Florence. There has been preserved the memorandum book of the operarius (there termed "proveditore"); it is also shown there, that the operarius merely understood as much or as little of building as any other citizen.

"This syndic shall compel the offenders to make good and repay these expenses fully to the said building, as in the observance of all the aforesaid. Then are free powers given to the advisers, by which they have to decide on the enlargement and the continuance of the said work, as well as in reference to the number of officials there shall be on the said building, as well as in everything pertaining to the work, according as it appears proper to them, or to at least two thirds of them. And since the duty is laid upon them, at least twice in the year, i.e., as it suits them in six months, to review the accounts of the entire receipts and expenses of the said building, and likewise to meet in their official service at least in each month, in order to transact whatever concerns the means and the interests of this building. Whoever shows himself negligent or indolent shall be fined up to 25 pounds denare for each occasion by the aforesaid upper syndic, excesses being always excepted. The said advisers shall furthermore be held under their oaths to meet in each week together with the aforesaid operarius on account of the business of the said work. And every order given by the said advisers or two thirds thereof relating to any new work, must be recorded by the clerk of this building in the building book in the presence of the operarius himself; and the building itself shall proceed in accordance with this order then expressed and not otherwise, under the said penalty. If the place of one of the said advisers remains vacant for two years after his period in office has expired, then for the clerk and the six advisers choice shall be made by the twelve

lord governors of the city of Siena and by the consuls of the chamber of trade, in each year for the months of July and December, for each six months, according as they think proper. The offices of Operarius and of clerk shall never be vacant.

The aforesaid clerk and operarius, and each of the same, are also held to record in order in a book everything that occurs, all receipts and expenditures for this building, with the date, i.e., the month and day, wherefore and from whom came the receipts and to whom the payments were made. And the four provisors of the city shall be required, on demand of the said operarius, to give the necessary lime for the said building. Likewise the said operarius shall be freely permitted to quarry and have quarried in the state quarries the required blocks of marble, to transport and have them transported at the cost of the city of Siena to the said building, indeed by guides, who indicate how far they must be brought from any village or any estate, also if the owner of the village or such an estate, or whoever has the control of it, has not agreed thereto, if the said operarius only pays the usual royalty to the lord of the said estate or of the village, or to whoever has the control thereof; with a money penalty of 100 pounds denare to be put into effect against whoever threatens the city of Siena, opposes this decision, or who as aforesaid will not permit the work to be completed. Nevertheless shall the method of compulsion take effect, that he freely permits the quarrying and transportation of the said blocks of marble."

On the Choice of the Operarius.

"By the twelve lords and the consuls of the chamber of trade of the city of Siena shall be chosen three fitting men in the city of Siena. And the one of them receiving most votes shall be the operarius of the said building, and his office aforesaid shall continue for one year and is counted from the day of his installation in office. This operarius shall give no one, whoever this may be, permission to take away anything of the stone or marble from the stone quarries of the said building, nor shall he agree that any one may remove any work whatever -- in any manner.

If there come to this operarius master tradesmen of the said building with tenders to execute a portion of the work, then

shall these be required to deposit with him fifty per cent of the wages, that they are to receive for the said portion, and the operarius is held to receive this sum and to employ it for the uses of the building. And the said operarius shall be required, if the architect of the said building undertakes any building for any individual person and is not then constantly busied with the service of the building, to withhold from him a part of his salary, in proportion to the wages of the other master tradesmen, and he shall watch, that he does not fall behind with stonecutting, when he records each day or point, in which the masters or the laborers or any one of them remains outside the said building, and he shall deduct it in proportion to the time, as such is usual."H

247 Thus it is clear that the Cistercian monks, who were operarii of the Cathedral of Siena, were not the artists but were mere managers of the building.

184. Donatus at Lund.

Finally, the Romanesque architect of the Cathedral of Lund in Sweden was likewise a layman. In the necrology of Lund occurs:--

"Donatus architect died, master of works of this cathedral." 175

Note 175. See Longebek. Script. Rer. Dan. III. 461. Copenhagen. 1772-1792.

185. Benno at Osnabrück.

Concerning the Bishop Benno of Osnabrück, who was perhaps one of the few ecclesiastics, that were architects, we find the following:--

Note 176. Vita Bennonis episcopi Osnabrugensis o.H. in Monumenta Germaniae historica. Sc. 12. p. 65 et seq. Hanover. 1856.

"But moreover he was an excellent architect, who designed buildings very skilfully.(?). Consequently he was also and always attached to the aforesaid king (Henry IV) in inseparable friendship. For already then commenced the beginning in germ of the Saxon war, that already since so long a time until now desolated the world, as we lament. Since that king understood very well, he began to fortify all Saxony with new and strong castles and endeavored to compensate for the desertion of the faithless by fortifying the land. In order to hasten this

and to carry it on industriously, he placed lord Benno in charge, since he knew that he had none truer and more competent to fill that office. For he could know his great experience in these matters from the Hildesheim building, where he was then present, and where it was known, that under his superintendence so many prominent buildings were built by Hezilo, the Bishop of this city, of pious memory.

How Bishop Benno cared industriously for the Spires church, so that the bank should not fall down by the undermining of the river Rhine, and how he entrusted to the Siegburg abbot the care of the monastery. He was likewise in architecture, as we have already shown, very experienced. If any one might imagine, that this does not particularly appear from our buildings here, then may he know, that a great number were built during his absence. He had these so constantly in mind, that while exiled and remaining in distant countries, he did not stop in building, while he bore this other. Therefore brought into the city of Spires at the king's command, he finished that very high church, which on account of the greatness of the building extended on the bank of the Rhine with too little foresight, with great knowledge and under difficult conditions on account (?) of the newness of this prominent structure. And that it might not be overthrown by the undermining of the river, he built vast masses of stone against it."

Whether all this was done by Benno as architect or as superintendent remains doubtful, if one judges of the detailed work of this ecclesiastical architect and the mode of narration -- a highly commendatory description of his life. Documents or inscriptions are wanting.

186. Bernward of Hildesheim.

Thangmar, in a similar biography of his pupil, S. Bernward of Hildesheim, makes him a cosmopolitan artist. Yet a single inscription remaining there, which originated under Bernward's eyes and is still preserved, only speaks of "permitting the casting."

"Bernward, the Bishop, had this chandelier cast by his servants (?) in gold, not in silver, but as thou seest, during the first bloom of this art."

187. Yso at Diesdorf.

The following statement concerning the "architect" of the Monastery Church at Diesdorf (between 1157 and 1161) remains very questionable:-- 177

Note 177. From Brechholtz. Versuch einer Geschichte der Churmark Brandenburg. Vol. 4. Document A. f. 6. Berlin. 1771.

"Count Hermann, son of Count Ulrich von Wertbeke - - - also placed here foundation canons and secluded nuns after the rule of S. Augustine; to serve God and S. Maria; where once the venerable brother Iso came, who created before God the eternal remembrance of his name, labored in this field day and night, and supported by his own labor and the alms of the faithful, completed this church with God's help."

In all other statements relating to ecclesiastical architects, the preceding explanation of an erroneous translation for "operarius" etc. so applies, that it is unnecessary to go into them further.

b. Gothic Architects.

Stonemasons' Regulations.

188. Regensburg Stonemasons' Regulation of 1457.

If the ecclesiastical architects in the Romanesque period have been found to be entirely an error, then are the honest stonemasons a still greater one as architects of the Gothic wonderful works.

Let us examine the existing mass of proof. These are first of all the Regulations of the stonemasons. The oldest and properly alone interesting is that of Regensburg of the year 1459. The others chiefly already fall in the time of the German Renaissance. They also present nothing but unimportant extensions or modifications of this first Regensburg Regulation. They are mainly the following:--¹⁷⁸ the Strasburg Regulation of 1459, the Torgau of 1462, the Basle of 1497, the so-called Brothers' Book of 1563, and the Querfurt Regulation of 1574. Furthermore, there are also different records of the original Regulation of 1459; such as the Vienna,¹⁷⁹ the Admont, and the Tyrol Regulation, the latter being of 1480.

Note 178. See Neuwirth, J. Die Satzungen des Regensburger Steinmetzentages nach dem Tiroler Hüttenbuche von 1460. Zeits. für Bauwesen. 1896. p. 175.

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The Commission, however, of the year 1911-1912... (See the original text, p. 248 - 253).

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Note 179. See Reichensperger, A. *Vermischte Schriften über christliche Kunst*. p. 159. Leipzig. 1856.

The Stonemasons' Regulations of the year 1459 have the following purport:-- (See the original text, p. 249 - 255).¹⁸⁰

219 Note 180. From Janner, F. *Die Bauhütten des deutschen Mittelalters*. Leipzig. 1876. The subdivision into paragraphs was 240 added by Janner to make possible more accurate citation. -- The 250 editions were used in Kloss' *Die Freimaurerei in ihren wahren* 260 *Bedeutung etc.*, Berlin, 1855, and in Heideloff's *Die Bauhütte des Mittelalters in Deutschland*. Berlin. 1855.

189. Interpretation of the Stonemasons' Regulations.

If the regulations of the stonemasons have heretofore been explained quite erroneously, this was because they were taken up with preconceived opinions, and men read these views into the regulations. If the regulations said something different from what the assumed opinions required, then the regulations erred and not the interpretation. Ecclesiastics, jurists and philologists might still be excused for their ignorance of architecture; but that the architect should first and most certainly have introduced the current errors relating to the "stonemasons" and the "building-lodges" is inexcusable, since the knowledge of architecture and of the industries must themselves remove those errors.

The only correct way will be to interrogate the stonemasons' regulations without preconceived opinions and to permit them to answer for themselves.

190. Training of Stonemasons.

What do the stonemasons' regulations say first of all concerning the training of stonemasons? Here it is:--

Par. 39. "First:-- No workman nor master shall take any one as laborer, who is illegitimate, knowingly, and he shall therefore earnestly question him that he takes and one such laborer by their faith, whether his father and mother sat together in marriage."

The "laborer" or apprentice, according to our modern speech, may then be taken either by a "workman" or by a "master". And he must learn for five years with either; for Par. 43 states the following:-- (See original text).

276 Further he could not be made a "parlierer" before he had lear-

learned for five years and had traveled for one year. For

the first five years (1850-1855) he was in the United States.

The first five years (1850-1855) he was in the United States.

The course of instruction followed was:-- five years as an apprentice, one year as journeyman, "master" (1855-1860). And indeed this entire course of instruction could be followed as a journeyman, as well as a master, and the first five years of apprenticeship the master became a journeyman, "if he had served his years of apprenticeship he would be entitled to be a journeyman, but it finally results from everything that follows. But on the other hand he has no right to be a journeyman, and as the journeyman of the "master" a master. Evidently a "master-timer" and not a journeyman.

Journeyman, who had traveled, "master" and journeyman were equal to each other; only especially distinguished between them. It properly defined that a journeyman or "master" succeeded in making him independent.

For the first five years (1850-1855) he was in the United States.

Now return to the beginning of the journeyman's apprenticeship. The first five years (1850-1855) he was in the United States. For the first five years (1850-1855) he was in the United States. For the first five years (1850-1855) he was in the United States.

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learned for five years and had traveled for one year. For Par. 40 says:-- (See original text).

And Par. 41 also:-- (See original text).

The course of instruction therefore was:-- five years as apprentice, one year as journeyman, "parlierer" (foreman). And indeed this extra course of instruction could be followed as well with a "workman" as with a "master." That after five years of apprenticeship the laborer became a journeyman, "if he had served his years of instruction" is nowhere expressly stated, but it plainly results from everything that follows. But on the other hand no rule prescribes anything, that made the journeyman or the "parlierer" a master. Evidently a "master-piece" did not cause this.

Journeymen, who had traveled, "parlierer" and masters were equal to each other; only capability distinguished between them. It probably sufficed that a journeyman or "parlierer" succeeded anywhere in making himself independent.

For Par. 2 says:-- (See original text).

Now return to the training of the journeyman stonemason. They could improve themselves further, if they so desired. For this purpose, they went to the "workman", not to the master. Only the workman could give further instruction; for Par. 25 states the following:-- (See original text).

Here is then "workman and master," since one and the same person is understood; otherwise "workman or master" is always employed, when two different persons are meant. The people wrote German quite correctly.

Therefore for this purpose, not merely the journeyman stonemason but likewise the "setter" went to the workman. And Par. 42 determines this as follows:-- (See original text).

And thus the stone-setter goes to the "workman" and not to the "master"; only he must serve a year longer than the stonemason.

What the journeyman stonemason then first learned from the workman is shown by the Querfurt Regulations a century later, at the time of the German Renaissance, which prescribes in Paragraphs 37 and 38:--

"Thus a journeyman, who had previously served sufficiently at the trade and desired to further serve a master in the art, so to speak, in stonework, carving or sculpture, then shall the

267 same learn this for at least two years. But if he only desires to learn concerning masses, twisted rising scrolls, vaults, or otherwise, he shall then serve an eminent master therefor, with previous agreement of the parts he desires to learn."

That is, the journeyman stonemason learned from the workman the elementary principles of construction. As journeyman, he did not know them, nor did the stone setter.

That these journeymen, who went to a workman to learn "some parts" for one, two or three years, in spite of all this were not workmen but only journeymen or masters, who understood stonework" is shown by Par. 12 and 4:-- (See the text).

And Par. 4:-- (See original text).

Thus besides the master and journeyman, "who understood stonework" and "who understands such stonework", there is the workman.

The word "work" plainly signifies here, what we today term "construction", so that "stonework" here is the same as "stone construction." For us this would be most clearly represented by building construction. Otherwise stonework is to be translated by "ashlar work"; for Par. 6 runs:-- (See the text).

But from this it clearly appears that masters and journeymen, in spite of the understanding building construction, are further termed so still and not workmen, that the heretofore described training of apprentices, traveling journeymen, "parlierers" masters and the pupils of the workman "for some parts" was not the training of the workman, but that of the stonemason journeymen and masters, as well as of those journeymen and masters, who "understand stonework." Workmen and stonemason masters are entirely different persons, who also neither have the same training nor type.

While the mason is now the same, who by further instruction has obtained the ground principles of architecture, then in 278 the middle ages the stonemason as with the mason, if after their training as stonemason or mason, they went to the workman. A And the stonemason was better advanced; he had to learn for but two years, while the mason must spend three of them. This is also clear; for in the middle ages in particular the churches were almost entirely of stone. The external surface was of dressed stone, and the internal surface likewise; the vaults

vaults and piers were also the same; at most the filling in the interiors of the walls, the piers and the foundation walls were left to the mason; all else was stonemason's work. The stonemason had the different parts in his own hands, wrought and set them; he only lacked the theory of how they were created. The mason also first had to become acquainted with their forms. That the journeyman stonemason merely desired to learn "some parts" with the workman further clearly shows, that the workman had still much more to learn, according to the modern conception of the architect.

But it then occurs, must one object, could the stonemason's apprentices learn from him the stonemason's trade? Then must he himself know the stonemason's trade; could he teach it otherwise?

This may also be answered, even if not entirely from this stonemasons' regulation. In the middle ages, the stonemason's work on large buildings was not let to master stonemasons, who wrought, delivered and set the same, but it was prepared under his own management; i.e., the architect engaged stonemason "parlierers" and journeymen, purchased the rough stone or had it quarried, and thus he himself erected on the site all the stonemason's work, the "stonework."

191. Weekly Account of the Building of the Cathedral at Prague.

Thus it occurred at the construction of Prague Cathedral; even the corresponding weekly account of the payment of wages to the "parlierer", the journeymen, etc. have been preserved:-- Two of these are here given.

"Dominica secunda", on which Misericordia is sung. 5/1/1373.

The day of Philip and Jacob.

Paid the master of the works 56 groschen.

Paid the parlierer 20 groschen.

Paid to Wiczemil 6 groschen.

Paid to shed laborers 4 groschen.

Item, 64 laborers at 10 pfennige, making 58 groschen and 3 pf.

Item, carpenter 20 gr. and his 4 helpers 30 gr. (1/2 schock).¹⁸¹

Note 181. 1 schock $\frac{1}{2}$ 50 Prague groschen; 1 Prague groschen $\frac{1}{2}$ 12 pfennige.

Likewise to the smith for sharpening, 8 gr., also for the b

breaking of the great anchor of the said gargoyle 2 1/2 groschen, also for 3 bands 4 gr.

Likewise to 4 setters 44 gr. and to 2 masons 15 gr.

Also to the workman who divided the lead 8 gr.

259 In the stonecutters' shed:--

Higl has 4 ells of moulding at 3 gr.

Likewise of the small gutter at 1 gr., he has 5 1/2 quarters; making 13 gr. and 5 pf. paid.

Wiercspurger has 2 finials at 8 gr., also a small corbel at 8 gr., making 16 gr. paid.

Haumann has a small corbel at 8 gr., paid.

Alff has a corbel at 8 gr., likewise a railing at 12 gr., making 20 gr. paid.

Friedell has a railing at 10 gr., paid.

Grucz has a corbel at 6 gr., 1 2/3 ell, making 10 gr. paid.

Andernoch has a corbel at 8 gr., further a pier in a balustrade at 17 gr., making 25 gr. paid.

Maysner has a corbel at 8 gr., paid.

Nicuss has a similar stone at 8 gr., paid.

Wenzel also has a stone at 8 gr., paid.

Total in the shed 2 schock, 6 gr. and 5 pf = 126 gr. 5 pf.

Further to Welco of Zehrovics for 3 great stones 22 gr., paid.

To Frenzlin for 2 boards 4 gr., paid.

To Wieczemil for one axe 3 gr, paid.

To master Peter for cord 4 gr., paid.

For 4 vessels for masonry work 3 gr., paid.

For nails and strips for "stellbock" 4 gr., paid.

To the sawmen 6 gr., paid.

For building lumber and strips 58 gr, paid.

To master Ken, the collector of collection money in the diocese of Saaz, we gave 1 gr. for expenses incurred by him on account of the church.

Further we gave to master Peter with the setters, masons and other workers as drink money at the closing of the great arch 1 schock gr. = 60 gr.

Further to Mixo, named Hrazak, for 36 baskets of lime, each of which contains 8 measures (at 1.42 litres), each measure reckoned at 14 pf., I paid 5 1/2 schock = 330 gr.

260 Further; at S. George's day, to Lord Benesch, Arch Prince of

Saaz, the building director, as his yearly salary, 5 schock gr. = 300 gr.,

Further to Andreas the notary of the building as his salary for the present period, we have given 4 schock gr. = 240 gr.

Further to master Peter, for the beginning of summer up to this time, we have paid 4 schock gr. = 240 gr.

Further to master carpenter Wenzel up to this date, 2 schock gr. = 120 gr.

Further to master smith Wenzel for summer coat 1 schock gr. = 60 gr., so that he may thereby more industriously manage the work.

Total for this week, including salaries of officials and for mortar, 31 schock gr., 51 gr. and 3 pf. = 1911 gr. 3 pf.

In the year of the Lord 1373.

On the third Sunday, on which Jubilate is sung.

To the architect as his weekly salary 56 gr. paid. To the parlierer, paid 20 gr. To the laborers in the shed 4 gr. paid.

Wieczmil the watchman for tools etc., 6 gr. paid.

To the laborers, 200 less 4, 10 pf. to each, making 3 schock, 18 gr. paid = 198 gr.

To the master carpenter 20 gr. paid. To his 4 helpers, 1 schock, paid, = 60 gr.

To the smith sharpener 15 gr.

Further for 8 bands, 10 gr. paid.

Further to 10 setters, each 20 gr., makes 3 schock and 20 gr. paid, = 200 gr.

Further to 6 masons, each 15 gr., makes 1 1/2 schock, paid, = 90 gr.

In the stonecutters' shed.

Benessauer has 6 headers at 4 gr., paid.

Alff has 4 headers at 3 gr., further 3 ells of the posts at 3 gr.

He further has 3/4 of the voussoirs at 20 gr.

Further, moulding at 4 gr., making 31 gr. and 9 pf., paid.

Fridel has one stone at 2 gr. and 3 pf., paid.

Higl has of voussoirs 3/4 at 11 gr.; also 4 1/2 ells of ash-lars at 8 pf.; also 5 ells of cornice at 3 gr., making 26 gr. 3 pf., paid.

26/ Haumann has 2 1/4 ells of posts at 3 gr.; also 2 corbels at

2 gr. each, making 22 gr. 2 gr., paid.
Given as of course at 8 gr. for 24 gr., paid.
Total in the end 111 gr.

Further to the wood sawyers for the timber, 22 gr. 4 gr.
1210.

Further for pine 9 gr., paid.

of, making 1 shock = 80 gr., paid.

Further for charcoal, one wagon at 20 gr., paid.

Further for wagon and making vessels 3 gr., paid.

Further for a oak, turned line oak, 2 gr., paid.

Further for 22 staves, 17 gr. 4 gr., paid.

Further for 22 beams, 41 gr. 3 gr., paid.

Shed rope for the second whistles, 1 1/2 shock = 20 gr.

Thus it was at Rebenburg Cathedral, at Cologne Cathedral, at

on September concerning the election of bishops have been

182. City Masters.

But there naturally were also in each city master stonecut-

ers, who satisfied the needs of the citizens, who furnished

one Par. 18 says the following:-- (See the text).

could not train as many journeymen as the great builders re-

quired and employed for centuries. The stone-masons, locates of

the great builders must therefore consider the training of the

the great builders must therefore consider the training of the

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the great builders must therefore consider the training of the

the great builders must therefore consider the training of the

8 gr. each, making 22 gr. 9 pf., paid.

Grucz has of corbels at 8 gr. for 24 gr., paid.

Total in the shed 111 gr.

Further to Welco of Zehnovicz for 2 stones 13 gr., paid.

Further to the wood sawyers for the templates, 35 gr. 4 pf. paid.

Further for pins 9 gr., paid.

Further to Welislaus for 36 baskets of lime, the load at 20 pf., making 1 schock = 60 gr., paid.

Further for hauling the great rope for the second windlass, 4 gr., paid.

Further for charcoal, one wagon at 20 gr., paid.

Further for measure and making vessels 9 gr., paid.

Further for a cask, termed lime cask, 3 gr, paid.

Further for 52 strips, 17 gr. 4 pf., paid.

Further for 38 beams, 41 gr. 3 pf., paid.

Further gave to Martin, who made the rope, for the second great rope for the second windlass, 1 1/2 schock = 90 gr.

Total of this week 18 schock 11 gr. and 10 pf. = 1091 gr. 10 pf.

Thus it was at Regensburg Cathedral, at Cologne Cathedral, at the Foundation Church of Xanten, etc. Everywhere that accounts or statements concerning the erection of buildings have been preserved, it appears that the "stonework" was not let by contract.

192. City Masters.

But there naturally were also in each city master stonecutters, who satisfied the needs of the citizens, who furnished them with enclosures for the windows and doorways, millstones and grave crosses. These are the city masters. These did not belong to the "order" and were not required to enter it. Therefore Par. 18 says the following:-- (See the text).

Now it is entirely clear, that the individual city masters could not train as many journeymen as the great buildings required and employed for centuries. The stonemasons' lodges of the great buildings must therefore consider the training of the corresponding recruits, i.e., must take "apprentices" for themselves. This occurred, and since every lodge had a "parlierer", he trained the apprentices in everything relating to the trade. Furthermore that the workman himself knew how to use the stone-

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stonecutter's chisel, even if not as a journeyman stonecutter, we shall show in the training of the workman.

193. Stonemasons.

It now remains to remove the chief objection, that one must meet:--if there were not really master stonemasons and architects as today, how does it come that the architects call themselves master stonemasons? This is likewise one of those "read in" errors. They do not term themselves master stonemasons, but masters, or master Gerhard, stonemason. Thus at last stonemason! Yes indeed! But the word stonemason does not designate the working stonemason, as is shown by the "regulations" themselves. In their beginning is stated the following:--

"That the owner of the building there may take care and see, and also for use and need will all masters and journeymen of the entire trade of stonework and stonemasons in German lands."

Can one conceive a sharper distinction between the masters and journeymen of the trade and the "stonemasons", then these stonemasons were not reckoned as of the trade?!

Also the second time that in the "regulations" the word "stonemason" is employed (it occurs in general in this manner only twice) in Par. 17 it is placed in opposition to Journeyman stonemasons, here to "traveling journeyman". This Par. 17 states:-- (See original text).

But what then signifies this mysterious word "stonemason"? The word "stonemason" in our modern speech has a corresponding associate in the word "painter". The German language designates by this word the artist as well as the tradesman, and it is quite unable by this word to distinguish artists from tradesmen. But everyone knows at once, that if a master painter, a journeyman or apprentice painter is mentioned, the tradesman is meant. To artist painters this common appellation is also so painful, that they seek in the most varied ways to avoid it the possibility. The most successful is "landscape painter, portrait painter, historical painter, etc.", the most risky being "art painter". These two kinds of painters likewise have no common training whatever, except that both understand how to use the brush and colors.

It is just the same with the mediaeval word "stonemason". The artist and the tradesman are termed "stonemasons"; but the

tradesman is called master, journeyman or apprentice stonemason, the artist being only a plain stonemason. This comes from the mediaeval training of the architect, which was far more suitable than that of the modern architect. Architecture is an art in space, in relief and not upon a surface like painting. It is therefore undoubtedly the only correct way and is better in any case, to train the imagination and the architect's gift of representation in space, rather than on a surface or on paper. The model excels the most beautifully rendered drawing or a hatched drawing. It is added, that relief ornament and the figure in the building play an entirely different part than the painted ornament. The latter is more easily omitted, and yet painted decoration is now almost exclusively learned, but relief decoration scarcely at all. The architect goes to the sculptor and orders the decoration from him. And thus one nearly always sees, that it is ornament from this or that sculptor and not from this or that architect. Is not this a degradation of the "architect artist"? Therefore the ornament is chiefly not at all original or not even appropriate, so entirely out of the scale of the rest of the building, expressing nothing and without any further development. No architect can learn from ornamental painting to practice the design and execution of relief ornament; he cannot even dignify it. By decorative painting, his eyes are not only closed for relief ornament, but are as if destroyed.

194. Training of the Architect as Sculptor.

Men will ask for proofs, existing for the training of the architect in the art of sculpture. Here they are. The architect of Prague Cathedral, Peter Parler (1356 - 78), received payment for the following sepulchral monument. ¹⁸³

Note 183. See Neuwirth, J. Die Wochenrechnungen und der Betrieb des Prager Dombaues in den Jahren 1372 - 1378. p. 324. Prague. 1890.

(See original text).

Likewise the architect of Regensburg Cathedral, Conrad Boriczen, was paid for the following sculptures. ¹⁸⁴ (See text).

Note 184. See Schurgraf. Nachträge zur Geschichte des Domus von Regensburg. p. 102, 108. 1855.

Thus we know of Nicolo Pisano (about 1270) that he was arch-

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"TWO MORE DAYS."

architect and sculptor, likewise of Erenzo Maitani (from 1310 onward) at Orvieto, that he was permitted to take apprentices.¹⁸⁵

(See original text).

Note 185. See Furt, L. Il duomo di Orvieto e i suoi restauri. p. 21. Rome. 1891.

And thus it stands in the Querfurt "regulation" itself in Par. 37:--

"Thus if a journeyman, who had served sufficiently at the trade, and further desired to serve at art, so st speak, at stonework, foliage or sculpture, then shall he learn the same for at least two years."

Thus runs the title of a Spanish architect, who belonged to the architectural society at Gerona:-- "Antonius Canet, stone-cutter, or sculptor of the statues of the city of Barchinonae."

264 But all sculpturs in Germany were likewise termed stonemasons. "Bastian Ertte, stonemason, 1610", stands on the splendid Renaissance tombs in the Cathedral at Magdeburg, of which every sculptor of the first rank would be proud today. The artist in stone, whether in stone construction or in the art of the sculptor, is called a stonemason, just like the tradesman. This then also explains the slight attainments in sculpture in so many times and places in the middle ages. It is entirely different to learn modeling as a training in the gift of representation and of conception in space as an architect, than to then practice this modeling as a sculptor. Only rarely will the architect be so gifted, as to produce excellent works in both arts, in architecture as well as in sculpture; and still more rarely will so much time remain to the architect of a great building, for him to likewise be able to create the sculptures himself.

But the architect and sculptor evidently had the same training in the middle ages, excepting that like the architect and engineer with us, only in after years did they by preference and exclusively devote themselves to one of the two arts. This better training of the sculptor also then explains their peculiar works in comparison with the present time, and in particular, that they succeeded in representing the clothing of their period, while later centuries will believe concerning the present time, that only military officers were clothed, everyone

else going about naked. If the architect were sufficiently vain to be unconscious of his inferiority as a sculptor, and and he had enough time during the slow construction of a building, then originated all the horrible but "genuine" long-tailed monkeys, which disfigure the Nuremberg and similar churches.

Besides, the training as a sculptor certainly included skill in handling the chisel. And if this skill with the chisel differs from the skill of the stonemason, then could the architect therefore use the chisel at need, since he had learned this during his apprentice years.

How these years of instruction passed, as good as no information has been preserved. Naturally, then is not to be read from the "stonemasons' regulations", since these were not made for stonemason artists, but only for stonemason tradesmen.

Then why are the "artists likewise in this regulation?" The architects were the masters of the younger journeymen stonemasons of the building lodges. Since they were set over these at the building site and were their providers, they also had the greatest interest in the organization of the stonemason tradesmen and held the leading place in and among them. Thus Par. 24 prescribes:-- (See original text).

195. Evidence of the Orders.

Thereby to the "workman" was assigned the highest powers, and indeed very characteristically, only if he had stonemason's work. Building lodges and stonemasons' lodges are furthermore to be carefully distinguished, and they have been erroneously regarded as the same. The stonemason's work in the stonemasons' shed, which is briefly termed "shed". Let us further consider the details.

266 To record the necessary expenses for the "order", each master must have a "box." Par. 31 therefore states:-- (See text).

Likewise here only the work people have a box, who support the lodge. Also at entrance is to be paid a contribution, for Par. 30 requires:-- (See original text).

These moneys are then collected together, "where the boxes lie;" for Par. 32 determines:-- (See original text).

In the books were entered the order and the name of the members of the lodge, as well as those of all journeymen instructed. The first is proved by Art. 27, that states the following:--

(See original text).

On the other hand, one of these books has been preserved and is now kept in the Library at Strasburg, to which it came after the death of the last master in Ermatigen in Alsace. Likewise in it is nothing to be found worthy of being kept secret. On the contrary, all names are inscribed there and the stonemason's mark of the possessor. The latter are so carelessly sketched, that all conjectures fail, making them making them portions of an unusually complex "key"; for this is lacking the necessary regularity and accuracy.

196. Stonemason's Marks.
The stonemasons' marks enjoy a consideration entirely undeserved and almost wholly without purpose. What is not written about these stonemasons' marks and not been expected from them? In particular, men desired to find out matters connected with the art by their aid. Nothing is more erroneous and impossible ²⁶⁶ than this. Men indeed believed, that each journeyman stonemason invented the forms, which he received. This could only be believed in the most complete ignorance of building procedures. That the contrary is true is proved by the documents, even to every one not an architect. One may then read the building accounts of Prague cathedral.

There Wiercspurger cut a small corbel at 8 groschen, and also Haumann, Alff, Andernoch, Maissner, Mikuss and Wacslaw. But on each of these evidently similar corbels is a different stonemason's mark; on one being that of Wiercspurger, on the second that of Haumann, etc. Which one of these stonemasons then designed the corbel? Naturally, neither one of them, but the architect, Peter Parler. They worked only after the template given out by him, what he had designed. If one journeyman went from Prague to Glatz to a different architect, then one finds the stonemason's mark of the journeyman in Prague and Glatz on cornices and stones, whose forms belong to the hands of entirely different architects and perhaps to two entirely different schools.

These stonemasons' marks prove nothing whatever for the art. They must be cut on a side permanently visible, so that one might always see who had wrought the stone. One cuts too wide and the other too narrow, the third carelessly; the fourth has entirely cut away the stone. But the skilled and qualified w

worker could point with pride to his mark.

Furthermore, stonemasons' marks existed already in the time of the ancient Romans. The city walls of Rome exhibit such of colossal size. In the late Romanesque or Early Gothic period, these are chiefly letter or other "speaking" marks; with the developed Early Gothic then appear the beautiful and distinct forms, which are principally known as stonemasons' marks.

197. Mystery in Art.

If it has been successful in presenting an entirely different picture of the stonemasons' order, than the writers on art have given, but a representation corresponding to real life, to reason, and before all to the verbal signification of the "regulations" themselves, it is then advisable to question the "regulations" concerning the other nursery fairy tales, what they should nominally teach.

Then there is first of all the assertion, that the "art" of these stonemasons was a mystery, which they must not "betray" under penalty. Yes, not merely a mystery, but even an arcanum, a stone of the wise, an independently effective recipe, that made those simple tradesmen, those worthy journeyman and master stonemasons competent to create the magical aisles of Gothic cathedrals after five years of cutting stone. The magical lamp of Aladdin was in their possession; we poor descendants were not even astonished, that we did not find again this magical lamp. We accepted all that as self-evident. All things were possible in the middle ages. Happy ancient times and poor enlightened modern period!

Does there stand in the "regulations" a law, that none should betray anything of his art? -- God forbid, nothing of the kind is therein. Par. 13 indeed states:-- (See original text).

But if the prohibition to teach those not properly entitled to it were the same as the command to betray nothing, then must "teacher" be translated by "betrayor." "To not teach" something is in nowise "to not betray" something. How could this "betrayal" have been previously forbidden, when no "regulation" existed? There were masters according to the verbal meaning of the regulation, who neither "regulated" nor participated heretofore. For Par. 18 says:-- (See text). Further Par. 49:-- (See original text).

Who are previously mentioned these matters to which they
are to be referred? And who should further hinder them in this?

to the matter for money and power? It is entirely clear,
that the regulation only devised to prevent, that without the
five years of apprenticeship with a master or a workman and a
without the year of wandering, and unless the journeyman has
proven himself, he may then further bring in a woman in
his learning. He may keep himself within the regular course
of instruction. (See text.)

Now the character of the apprenticeship is shown
by Schiller in the work mentioned below. The text is a pro-

cess of German literature as different writers. He writes
therein:--"The more difficult it is for the artist to cor-
rectly understand a thing, since the craftsman was accustomed
to sketch and projections of the different stages on and ab-
out the thing. It is not so in the artist, who has to
create and develop itself from that spiritual mass of ideas.
Only the student should know how to interpret these three-
dimensional; in the stage of 1839 on the loss of these rights,
it is necessary to say, that the artist is not a craftsman,
but a free man. He is not a craftsman, but a free man.

Encyclopedia, Leipzig, 1887.
The artist is not a craftsman, but a free man. He is not a craftsman,
but a free man. He is not a craftsman, but a free man.

It is known, that the artist is not a craftsman, but a free man.
The artist is not a craftsman, but a free man. He is not a craftsman,
but a free man. He is not a craftsman, but a free man.

Who had previously forbidden these masters to teach their art to others? And who should further hinder them in this? And now just those, who were excluded from the order, as Par. 16 states:-- (See original text).

Were not all these already for revenge secretly prostituted to the waiting for money and praise? It is entirely clear, that the regulation only desires to prevent, that without the five years of apprenticeship with a master or a workman and without the year of wandering, and unless the journeyman has wrought practically, him from further going to a workman in his learning. He must keep himself within the regular course of instruction. For Par. 44 says:-- (See text).

How the mysteries of the stonemasons were created is shown by Schultz in the work mentioned below. ¹⁸⁶ Fig. 291 is a reproduction of a mediaeval drawing of the plan for a tower buttress of Cologne Cathedral at different heights. He writes thereon:-- "Yet more difficult is it for the uninitiated to correctly understand a plan, since the draftsman was accustomed to sketch the projections of the different stones on and about each other. It belongs to an expert to see the structure arise and develop itself from this enigmatical mass of lines. And that should also be so according to the will of the master; only the stonemason should know how to interpret these hieroglyphics; in the statute of 1459 on the loss of trade rights, it is forbidden to any workman, master, "polierer" and journeyman:-- (See original text).

Note 186. Schultz. A. Einführung in das Studium der neuern Kunstgeschichte. Leipzig. 1887.

Such hieroglyphics have remained to Schultz the mediaeval architects, although he wrote an appendix on "German cathedral architects" in Dohme's "Kunst und Künstler des Mittelalters und der Neuzeit." (Berlin. 1876).

In a remarkable way, the stonemasons' order was developed only in Germany. At least no account of it is found in other countries. This is complete evidence against the teaching and extension of mediaeval architecture by means of any secret method and instruction, as expressed in the stonemasons' regulations and as they would have existed in the "stonemasons' lodges."

Then who instructed in other lands and especially in France

the honest master tradesmen in the art, how to create by means of secret teaching and magical methods the masterpieces of mediaeval art? Furthermore, there is to be found in Germany also before the Regensburg regulations of 1459 no evidence of the existence of such a stonemasons' brotherhood in the time of the Romanesque, early and high Gothic art.

For if one already accepts the expression (see text) for a high antiquity of the stonemasons' order, this is still expressly said only of custom and use and not of the order, and the same paragraph further states:-- (See original text).

It is further expressly stated, that the architect was then first required to join it:-- "Item; -- whatever master is also not in the order of the workmen is required . . ."

The Treves "regulations" of 1397¹⁸⁸ published by Reichenspurger, like the French one of Etienne Boileau of the year 1258¹⁸⁹ are nothing else than the usual ordinances in reference to master tradesmen, journeymen and apprentices, they were everywhere common in the cities and they did not apply to architects, but only to tradesmen.

Note 188. See Reichenspurger, A. Vermischte Schriften über Christliche Kunst.

Note 189. See Dopping. Reglements sur les arts et metiers de Paris du XIII siecle. -- The prefect of the city Boileau has recorded the statutes of all Parisian guilds.

We must here take leave of the stonemasons' order and of mediaeval architects. The extent of this Part is exhausted. The inscriptions and documents relating to Gothic architects may follow in the next Part, that is likewise devoted to Romanesque and Gothic architecture. This will contain the details, such as bases, capitals, windows, doorways, paintings, sculptures and church furniture.

If the author should succeed in showing by the representation of the course of development of mediaeval architecture, how these masters succeeded in their new creations, to thereby incite modern architects to adapt architecture in a similar way to the requirements and to reason, then would the purpose of the present and the succeeding Parts be attained.

But to the immortal architects, the bold and clear colossal geniuses of mediaeval art are these Parts dedicated!

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